THE IRON AGE

AUGUST 12, 1937

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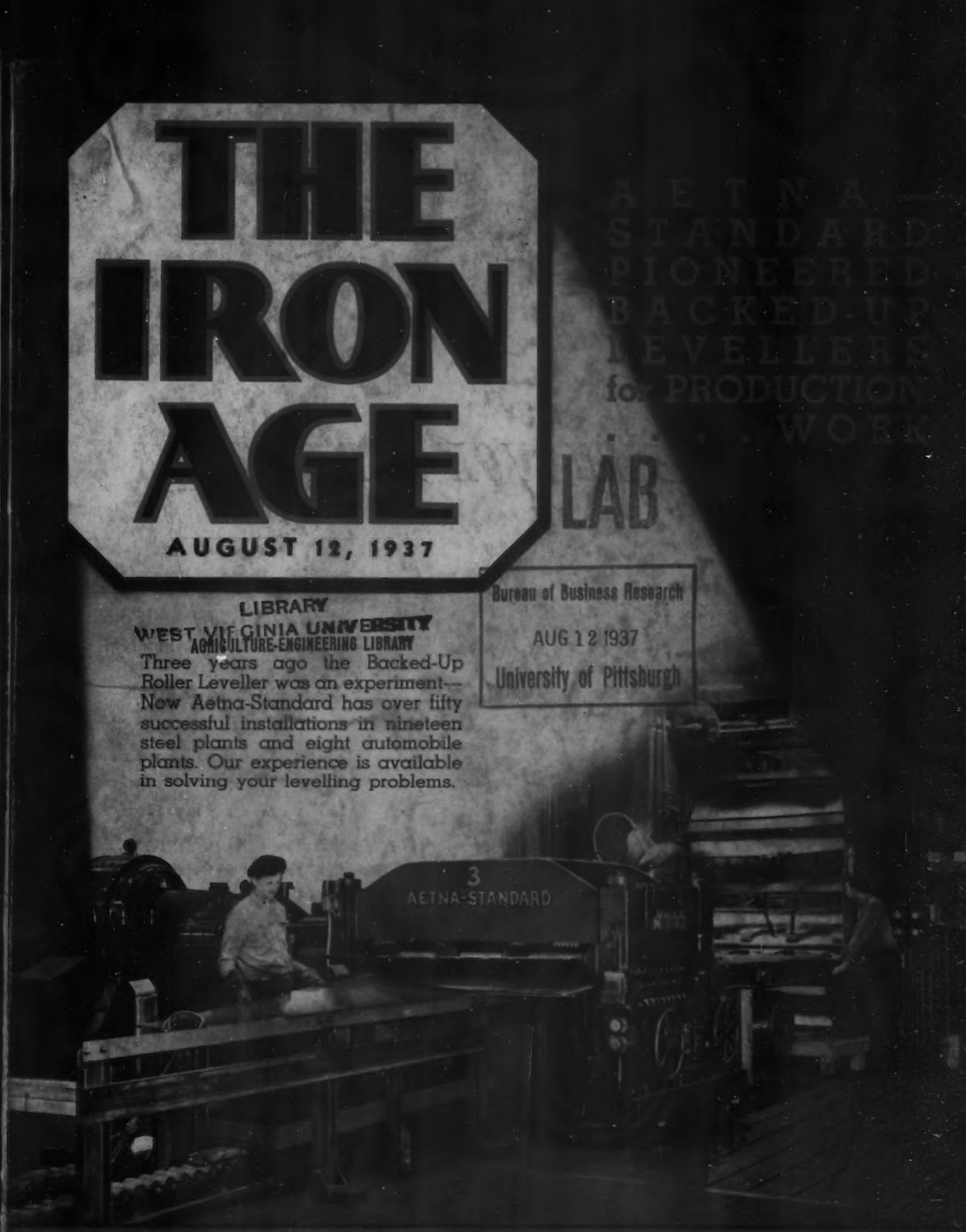
AETNA STANDARD PIONEERED BACKED-UP LEVELLERS for PRODUCTION WORK

LAB

Three years ago the Backed-Up Roller Leveller was an experiment—Now Aetna-Standard has over fifty successful installations in nineteen steel plants and eight automobile plants. Our experience is available in solving your levelling problems.



THE AETNA-STANDARD ENGINEERING COMPANY
CONSULTANTS · DESIGNERS · BUILDERS
STEEL AND NONFERROUS INDUSTRIES
YOUNGSTOWN · OHIO · U.S.A.

BIG ENOUGH FOR THE JOB!

AG-ENG LIB.
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Only helical Spring Washers of ADEQUATE Size and Power will **Keep** *Machinery tight*

Not only *Live Action*... but a *sufficient amount of it* is indispensable in combating wear and vibration. Every correctly designed bolted assembly *must* include *helical* Spring Washers... *adequate in size and power* to keep parts as *tight* as the designer intended.

SPRING WASHER INDUSTRY
616 WRIGLEY BLDG., CHICAGO, ILL.

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*. Publication Office, Chestnut & 56th Sts., Philadelphia, Pa. Editorial and Executive Offices, 239 W. 39th St., New York, N. Y. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under Act of March 3, 1879. $6.00 a year in U. S., Canada $8.50, Foreign $12.00. Vol. 140, No. 7.

In Smart Coiffures or Special Steels

SERVICE IS INDIVIDUAL

The requirements of the smartly coiffured woman are no more individual and exacting than those of many steel-using manufacturers. In these days of unusual industrial problems, the maker of fine steels must be more than an expert on his own product. He must know his customers' needs—and meet them *exactly*.

Ludlum service reaches into the customer's plant—as it did in the case of a New York manufacturer of bolts and nuts. One of his problems involved a special cold-headed up-set bolt made from ⅜" cold-drawn wire and measuring 1¼" in length, 1⅝" across the head, and ¾" radius under the head, with a variance of only .001" permitted. Every brand of steel submitted either split through the middle or lost size so rapidly that production almost came to a standstill. An SOS reached Ludlum, whose engineers promptly went to work on the problem. After careful study and tests, they recommended a Ludlum steel affording the necessary resistance to shock, wear and severe side strain. The customer immediately ran out his entire order of 15,000 bolts, using only one die.

Whenever you strike a snag or want better results on your own steel applications, get in touch with Research Department, Ludlum Steel Company, 812 A Street, Watervliet, N. Y.

LUDLUM

FINE STEELS SINCE 1854

TOOL · STAINLESS · CARBON · ALLOY

Resisting the fine sand and grit carried at bullet-like speed by the famous gales of the dust bowl is a supreme test for any structure. Thousands of bearings have thus been ruined in a few hours . . . but not those of the IDECO pumping units. ● The International Derrick and Equipment Company, which manufactures this pumping unit, equips both upper and lower Pitman Bearings with "Perfect" Oil Seals. They are thus fully protected against entrance of sand, grit and moisture . . . also against loss of lubricant. As a result IDECO bearings have a much longer useful life and give much better service consistently.

Ask Chicago Rawhide engineers for their suggestions on lengthening the life of your bearings.

CHICAGO RAWHIDE MANUFACTURING COMPANY

1306 ELSTON AVENUE • CHICAGO, ILLINOIS

59 Years Manufacturing Quality Mechanical Leather Goods Exclusively

PHILADELPHIA • CLEVELAND • NEW YORK • DETROIT • BOSTON • PITTSBURGH • CINCINNATI

Values worth waiting for

Women are keen buyers. If you want to find the store in town where the best values are, look for the one with a crowd waiting for the doors to open. Those women know that the better values in that store are well worth the inconvenience of waiting.

You don't buy a turret lathe for a week or a month. You're going to use that Turret Lathe for years. Properly selected, it will make money for you every day of those many years.

Warner & Swasey can now make prompt delivery on several sizes of Turret Lathes and we won't keep you waiting long on any size. Furthermore we promise this—

—Any Turret Lathe you order will be exactly fitted to your needs, designed to make you the maximum savings, or we'd rather not have the order.

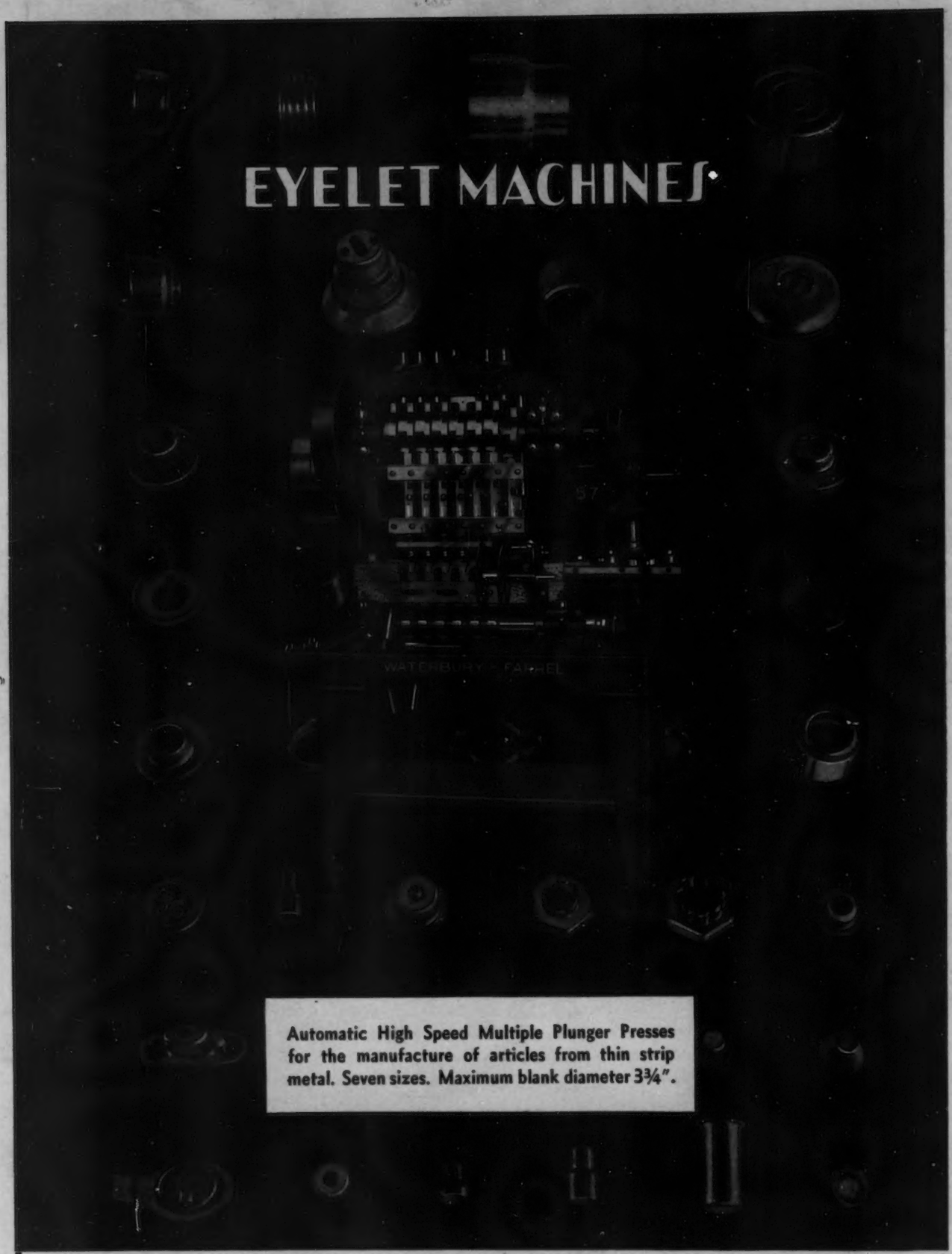
—The delivery date we give you *will be kept*—you can base your new plant or addition or production schedule on our date.

—You can be sure we will not accept your order and then, to save some future sale, switch your machine to someone else and keep you waiting.

It's in front of the busy store, where the values are, that you see the keenest buyers.

WARNER & SWASEY
Turret Lathes
Cleveland

YOU CAN TURN IT BETTER, FASTER, FOR LESS—WITH A WARNER & SWASEY



Automatic High Speed Multiple Plunger Presses for the manufacture of articles from thin strip metal. Seven sizes. Maximum blank diameter 3¾".

WATERBURY FARREL FOUNDRY AND MACHINE COMPANY

Home Office and Works: Waterbury, Conn.

Cleveland Chicago Newark, N. J.

INCREASE PRODUCTION

...*avoid* delays!

Regal Oil G is recommended for circulating oil systems where gears and bearings must be lubricated by the same oil.

Regal Oils J and K are for use in continuous type strip mills. J is recommended for reduction gear sets and bearings; K for pinions, roll-stand bearings and screw-down parts, where an oil of somewhat higher viscosity than Regal Oil J is necessary to meet manufacturers' specifications.

You can safeguard your continuous mills against production delays caused by equipment failure... by lubricating them with Texaco Regal Oils G, J and K.

The outstanding advantages of these Regal Oils G, J and K are that they do not break down into damaging sludge and carbon deposits. They separate readily from water . . . resist emulsification and oxidation. They are made clean and can be kept clean.

Many oils used in continuous mill operation, emulsify, oxidize, and form sludge and carbon deposits in the circulation system.

Trained lubrication engineers are available for consultation on the selection and application of Texaco Lubricants in the steel mill. Prompt deliveries assured through 2070 warehouse plants throughout the United States.

Don't put up with anything but the best. Switch to Texaco Regal Oils G, J and K and keep your equipment going.

The Texas Company, 135 East 42nd Street, New York City.

TEXACO

Industrial Lubricants

Wherever you look there's a place for....

WEIRTON STEEL COMPANY, WEIRTON, WEST VIRGINIA

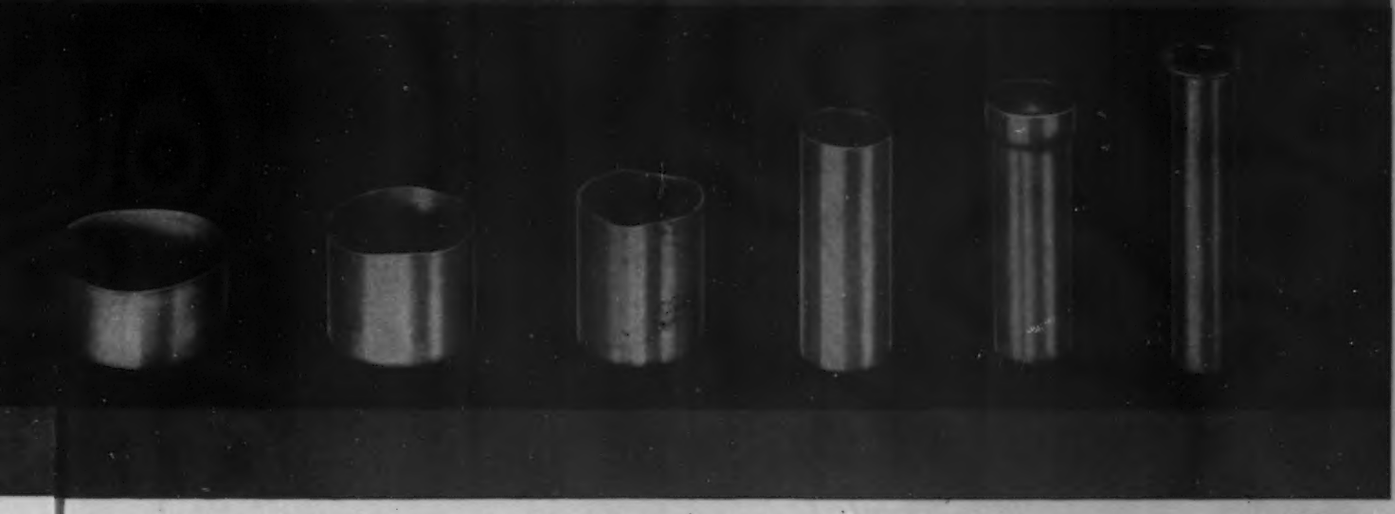
DISTRICT SALES OFFICES: *Boston*, 1001 Statler Office Bldg.; *Chicago*, 228 North LaSalle Street; *Cincinnati*, 2606 Carew Tower; *Cleveland*, 1217 Leader Bldg.; *Detroit*, 11-210 General Motors Bldg.; *New York*, 500 Fifth Avenue; *Philadelphia*, 1462 Broad St. Station Bldg.; *Pittsburgh*, 2800 Grant Bldg.; *Rochester*, 45 Exchange Street; *San Francisco*, Sharon Bldg.; *Toronto*, General Assurance Bldg., 357 Bay Street

UNIT OF NATIONAL S

....WEIRTON STEEL

Better Products start with Better Steel
WEIRTON STEEL

The progress photographs below show how Weirton Strip readily responds to severe drawing operations



L STEEL CORPORATION

NATIONAL STEEL

FOR HIGH PRODUCTION AND PRECISION WORK

INQUIRE ABOUT

BAIRD AUTOMATICS—

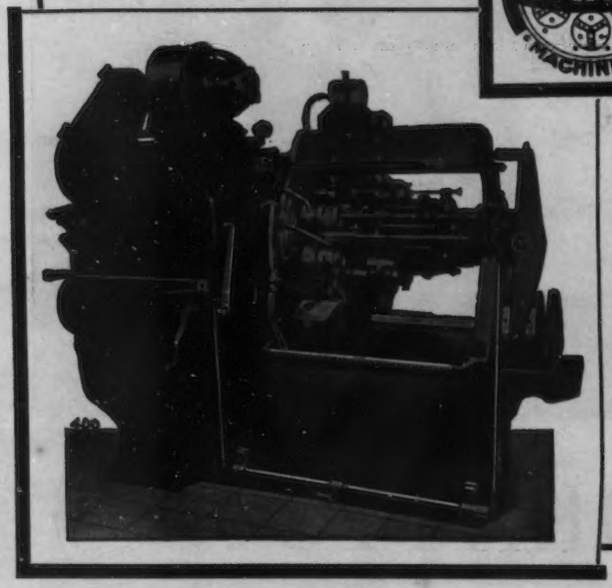
SINGLE SPINDLE VERTICALS

MULTIPLE SPINDLE VERTICALS

MULTIPLE SPINDLE HORIZONTALS

CONTINUOUS AND INDEXING
LATHES, CHUCKING MACHINES, GRINDERS

SPECIAL BUILT TO ORDER, HIGH PRODUCTION AND MULTIPLE OPERATION MACHINES.



Save by Accurate Machining

"Ask Baird About It"

THE BAIRD MACHINE COMPANY

BRIDGEPORT, CONN.

Why USE A-C WELDING?

BECAUSE it's faster—on any application where magnetic blow slows up direct-current welding and limits the amount of current that can be successfully used. With G-E alternating-current equipment, trouble from magnetic blow is avoided—thus permitting heavier currents and larger electrodes to be used with the result that welding speeds are considerably increased. Here are some typical examples of a-c applications: thick-walled pressure vessels, high-pressure piping, penstocks, refining vessels, steam boilers, heavy machine frames, and similar applications.

Because it's better—on many heavy-current applications. Agitation of the molten pool of metal by the alternating current refines and improves the quality of the deposited metal. This characteristic, plus its avoidance of magnetic blow on heavy-current work, results in consistently stronger, denser, and more uniform welds than ordinarily obtained with direct current.

Perhaps there is a place in your plant where G-E alternating-current arc-welding equipment can be profitably used. Don't make costly compromises. Consult your local G-E arc-welding distributor or G-E sales office. They handle the largest variety of arc-welding equipment on the market, including a-c, d-c, and atomic-hydrogen equipment, in all sizes for hand or automatic operation. Their recommendations are unbiased and they have had years of experience in helping users to obtain maximum profits from their arc-welding applications. General Electric, Schenectady, N. Y.

G-E a-c transformer-type arc welder for such uses as repair, maintenance, and job-shop work. Welding range 50 to 150 amperes

G-E a-c transformer-type arc welder—sizes 300 to 1000 amperes

Large gooseneck arm, used to connect trailer to truck, being welded with G-E transformer-type welder

Advantages of the G-E Alternating-current Welder:

1. Avoids magnetic blow.
2. Provides proper current for making dense, reliable, uniform welds.
3. Saves up to 50% in power costs, as compared with rotating a-c welders.
4. Built with the care and workmanship that have characterized G-E transformers for 40 years.

Dept. 6-201, General Electric Schenectady, N. Y.

Gentlemen:

Please tell me if G-E transformer-type welders could be profitably used on the type of work briefly described in the outline I have attached.

Name..... *Firm*.....

Street.....

City..... *State*.....

140-65

GENERAL ELECTRIC

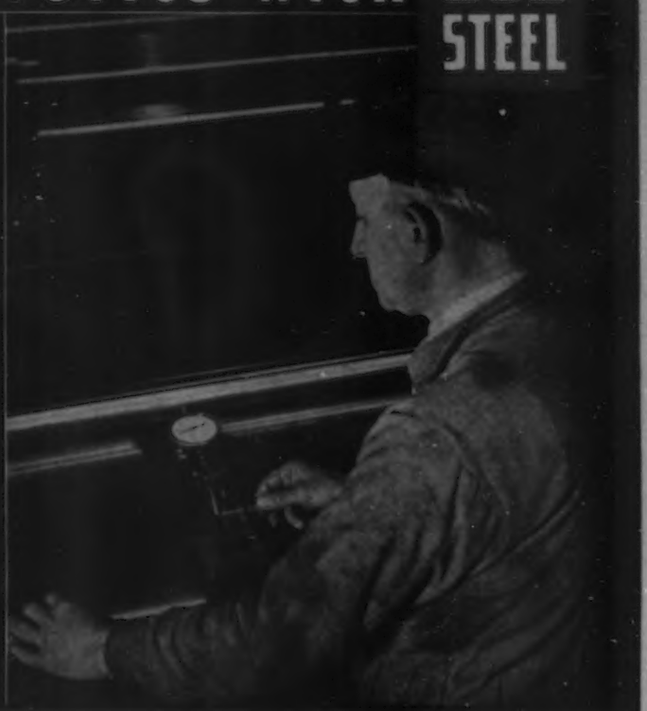
Wherever there's Motion...you'll find SPRINGS

SPRINGS ARE AN IMPORTANT FACTOR IN TODAY'S LIFE - WITH A FULL REALIZATION OF THIS FACT, B·G·R COMBINES THE SKILL OF CRAFTSMANSHIP WITH THE BEST IN ENGINEERING PRACTICE FOR ONE RESULT—"SPRING PERFORMANCE"

BARNES • GIBSON • RAYMOND TWO PLANTS **DETROIT, ANN ARBOR, MICHIGAN**

DIVISION OF ASSOCIATED SPRING CORPORATION

Increase your profits with J&L STEEL



J&L Cold Finished Shafting
is straight, smooth and true to size

. . . gives you the economy of smooth-running, balanced drives . . . with minimum vibration

J&L Cold Finished Shafting is straight and true . . . reduces friction . . . fits bearings snugly. It lines up accurately . . . runs quietly . . . lasts through years of service. Thus you have lower repair bills . . . get longer life from drives and bearings . . . reduce vibration and wear.

Whether your machining operations consist of cutting keyways, dowel grooves and shoulders, boring oil feed holes, or drilling and reaming holes for key pins, the superior machining quality of J & L Shafting will help you attain reduced fabricating costs.

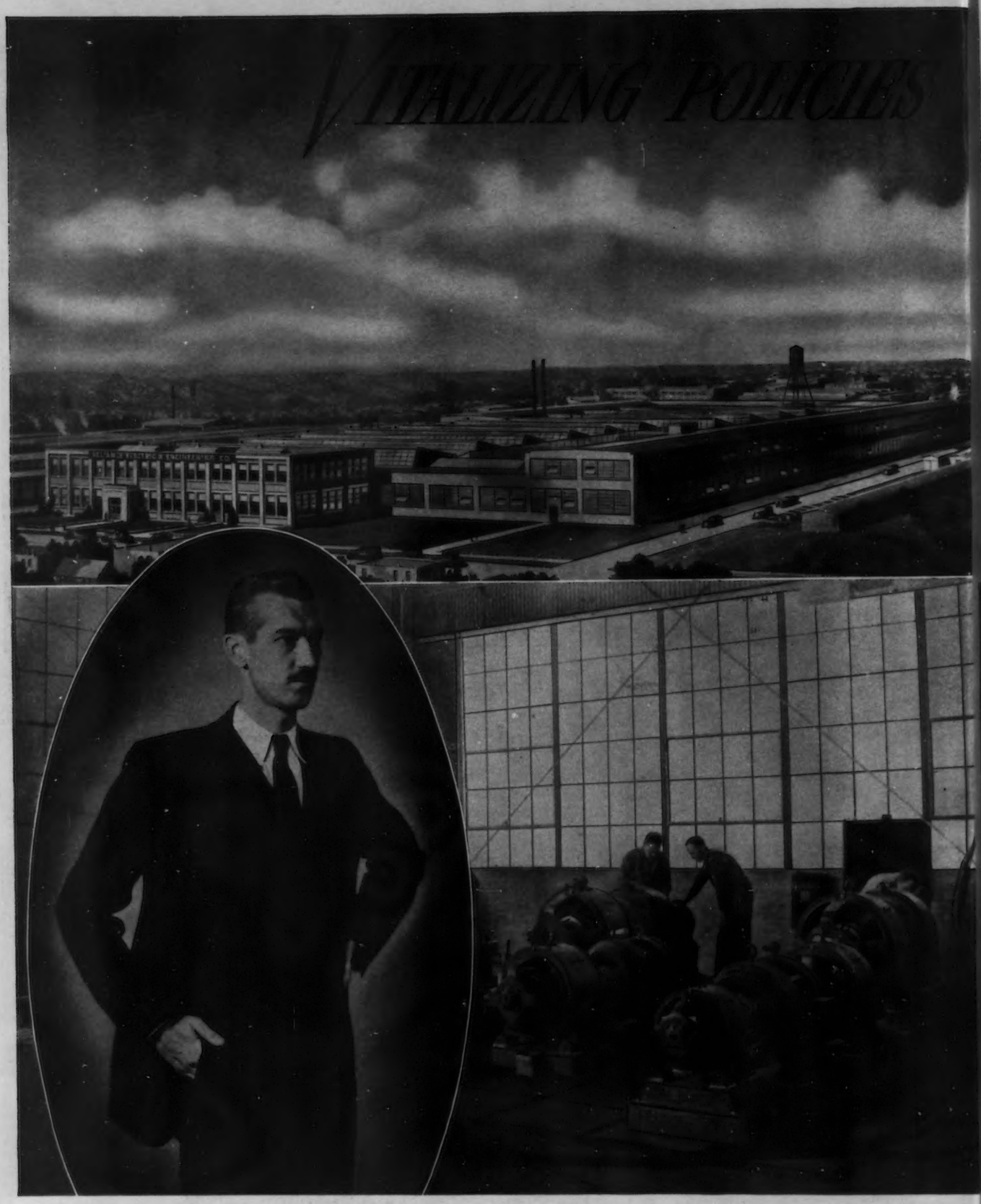
Many shafting users standardize on J&L Shafting . . . turned and ground, turned and polished, and cold drawn. They know it reduces overhead, lengthens the life of drives and bearings, saves time in lining up assemblies, reduces machining and manufacturing costs.

You, too, can be sure of these economies. The right grade of Jones & Laughlin Shafting for *your* requirements is available from distributors everywhere. Specify and buy J&L . . . and save money.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

MAKERS OF HIGH QUALITY IRON AND STEEL PRODUCTS SINCE 1850



S. B. Taylor came into production work with a background of experience in both the electrical and mechanical design of Reliance Motors. As a consequence he supervises manufacturing with a keen appreciation of how sound design can be best translated into the finished motor.

through Understanding

We are glad to have our friends visit us because by doing so they get first-hand evidence that we have the essentials for creating a good product—a modern plant, efficient machinery and up-to-date methods. There's something else about the place that's not so tangible, but still is mighty important. It has to do with the men who build and supervise. » » » In the 31 years that we have been making motors, a clear understanding has developed all down the line about the following things . . That it's definitely a part of the Reliance plan to build motors that are unexcelled and to make sure they do all that is expected of them . . That Reliance is catering to plants where motors must do hard work, so that the best of workmanship is required to supplement liberal design and high-grade materials . . That each man contributes to promoting the Reliance reputation for top-notch quality and helpful service if he does his own job well and becomes an effectual team-mate when cooperation is needed.

S. B. Dayton

Works Manager,
Reliance Electric and Engineering Company

Below — Grinding armature shafts to close tolerances is typical of the care taken to assure accurate fits and the interchangeability of parts for Reliance Motors. We are accustomed to pleasing people who are particular about such matters, especially as they concern the mounting of motors for direct drives.

Above—Thoroughness is emphasized as an essential to quality in the construction of many Reliance parts. For example, to make certain of tightness, this commutator will be heated and tightened six times. It will be given a seventh heating and tightening on the completed armature.

Above — This armature, when completed, will hide good quality in hundreds of vital spots. Appearance and electrical inspection will stamp it as a job well done. But only years as a dependable producer of power will prove how important is the contribution made to its excellent record by good materials and skilled hands.

RELIANCE A-C D-C MOTORS

Reliance Electric and Engineering Company • 1088 Ivanhoe Road, Cleveland

Branches: Birmingham, Boston, Buffalo, Chicago, Cincinnati, Detroit, Greenville (S. C.), New York, Philadelphia, Pittsburgh

Representatives in Other Principal Cities

TO USERS OF MECHANICAL TUBING:

THERE'S A *Shelby* DISTRIBUTOR NEAR YOU—READY TO SERVE

TWENTY-FIVE Shelby Distributors are at your service. Through them you can draw on large and well assorted stocks of this widely used mechanical tubing. Round, square, rectangular, oval, and other shapes—numerous sizes, lengths, and wall thicknesses — various finishes and grades of steel are available.

For speedy service, call the Shelby Distributor in your vicinity. Your order will be promptly and intelligently handled.

SHELBY DISTRIBUTORS

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Austin-Hastings Co., Inc.
226 Binney Street
Cambridge, Mass.
Phone: Kirkland 4480

BUFFALO, N. Y.
Peter A. Frasse & Co., Inc.
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Phone: Washington 2000

CHICAGO, ILL.
C. A. Roberts Co.
20 Aberdeen Street
Phone: Haymarket 6330

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E. K. Morris & Company
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Phone: Main 1525

CLEVELAND, OHIO
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DENVER, COL.
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Peter A. Frasse & Co., Inc.
State Tower Building
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TORONTO, CANADA
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NATIONAL TUBE COMPANY

PITTSBURGH, PA.

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

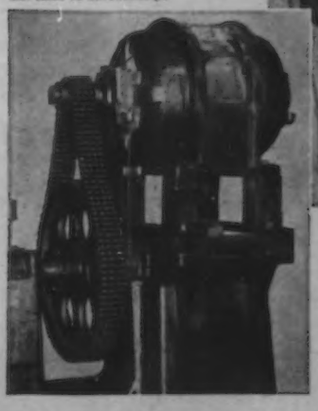
UNITED STATES STEEL

DOES YOUR MACHINERY OUTPUT SLIP DOWN?

There is a way to prevent it!

● Production men often note a gradual reduction in machinery output—and investigations too often show that the drives have allowed a decrease in the speeds of the machines. Such loss of output over a month's time is serious because of the present demand for *faster* sustained production. Diamond Roller Chain Drives are positive—no slipping nor slippage losses are possible . . . machinery production is kept to the full maximum *always*. . . . As production has speeded up, the use of Diamond Drives has increased greatly—over 8,000 in one plant alone. . . . Here is your answer to greater production.

Below: Roller Chain Drive; easy to remove or install without any dismantling of machinery. Removal of one pin is all that is necessary.



Directly above: Diamond Roller Chain Drive from 20-tooth sprocket to 102-tooth sprocket. In spite of the high ratio and short center distance, no slipping is possible.

Above in margin: Diamond Roller Chain on tube-forming machine where ruggedness and dependability, as well as positiveness of drive, are essential.

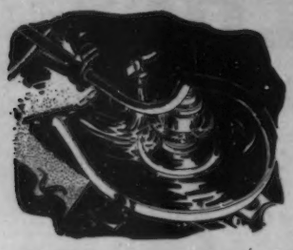
DIAMOND DRIVES CAN'T SLIP

You will get the most out of your present equipment, and out of the new you are installing by means of Diamond Roller Chains. . . . They are stocked in important cities throughout the country. . . . Give us information now on one or two drives and we will make complete recommendations.

DIAMOND CHAIN & MFG. CO.
433 Kentucky Ave., Indianapolis, Ind.
Offices and Distributors in Principal Cities

DIAMOND ROLLER CHAIN

RIGHT DOWN YOUR ALLEY



Better Cutting Oil Saves Cutter Costs, Increases Production

Speeding up production on gear shapers in a Michigan manufacturing plant recently presented a problem in gear cutter maintenance. Under high speed operation, excessive tool wear indicated the need for a better cutting oil but the plant manager, objecting to the higher cost, tried out a number of low-priced lubricants.

With the best of these cheaper oils the cutters produced only 15 to 18 pieces per grind and it was necessary to grind off each cutter an average of .015 of an inch to put them back in shape.

Here's where the Standard Lubrication Engineer came in. He recommended a special high grade cutting lubricant. Tests on this oil showed an increase to 30 pieces per grind and less than .005 of an inch removed from the cutters at each grind.

Increased output and the saving in cutter life made the cost of this higher priced oil a negligible item. There's a Lubrication Engineer in your local Standard Oil office ready and willing to give you this same helpful service on any metal cutting operation.

Standard Oil metal working lubricants include:

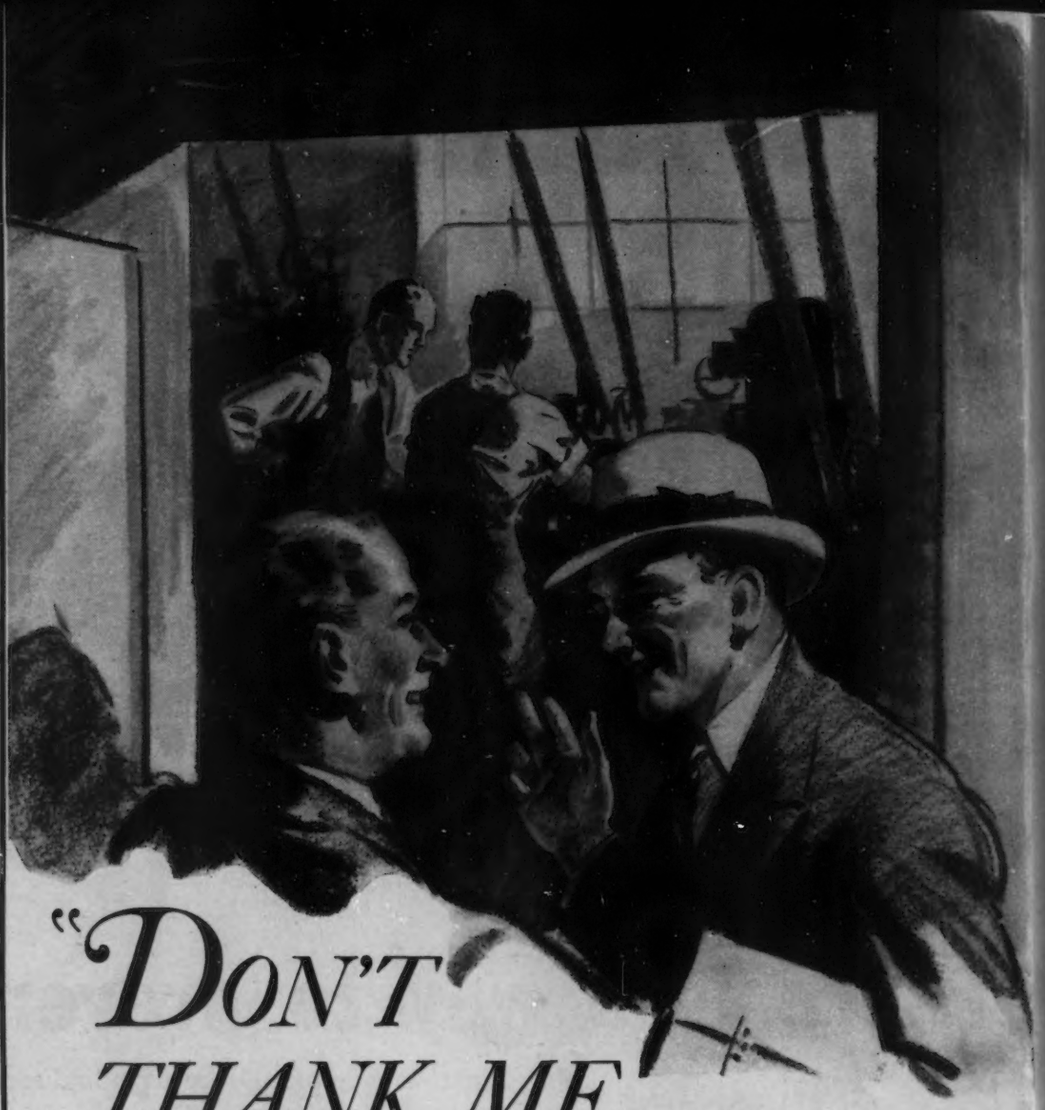
PREMIER CUTTING OIL
ACME CUTTING OIL
SUPERLA SOLUBLE OIL
STANDARD PASTE COMPOUND
MINERAL SEAL
STANOSTAMP

For your information on

"LUBRICATION IN GRINDING OPERATIONS"

A booklet by this title is available to you from Standard's library of monographs. It covers the important factors of operation on external, internal and centerless grinding and the oil requirements for these operations. On the theory that an understanding of the problem is half the solution, this booklet will be valuable to those men interested in reducing grinding costs. Write for this or booklets listed below. Address Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois.

"Lubrication in Honing & Lapping"
"Lubrication in Gear Cutting"



"DON'T THANK ME, MR. MORTON,

Your Superintendent, there, made these savings possible."

HE isn't just tossing bouquets, either. In making that statement the Lubrication Engineer is perfectly sincere. You'll find that typical of all Standard Engineers —typical of their attitude and the methods they use in working with anyone in your plant.

It's plain common sense. The superintendent, in this case, was the man who called in the Engineer. His foresight was directly responsible for whatever saving resulted from their study of the lubrication problem.

Although thoroughly familiar with lubricants and their application, Standard Engineers know that conditions vary from plant to plant, even on machines of the same type and make. The men on machines, the foremen in charge, the plant engineers—all have an intimate knowledge of the equipment they operate. A Standard Lubrication Engineer values and respects their opinions.

When you call a Standard Engineer he works *with* your organization, contributing his knowledge in a spirit of helpful cooperation. His only reward for the savings you make is the good will it brings his company and Standard Oil products.

This helpful, friendly service is yours for the asking. Just call your local Standard Oil (Indiana) office and ask for a Lubrication Engineer.

Copr., 1937, Standard Oil Co.

STANDARD OIL COMPANY (INDIANA)

LUBRICATION ENGINEERING

THE RIGHT LUBRICANT • PROPERLY APPLIED • TO REDUCE COSTS

Calcium-Manganese-Silicon
—*a better Ladle Deoxidizer*

CALCIUM-MANGANESE-SILICON added to the ladle dissolves readily, exerts a powerful deoxidizing influence and leaves a clean, sound steel. This alloy, when added alone, promotes the formation of a coarse-grained structure, as determined by the McQuaid-Ehn Test, but when added in combination with aluminum, intensifies the grain-refining influence of the latter metal. A good recovery of manganese and silicon is obtained when calcium-manganese-silicon is used.

Electromet can supply you with calcium-manganese-silicon and assist you to use it advantageously. Electromet metallurgists will gladly call and help you with specific problems regarding the use of any Electromet ferro-alloy. Write for further information.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

Carbide and Carbon Bldg., 30 East 42nd St., New York, N. Y.

CHROMIUM
Low-Carbon Ferrochrome (in grades, maximum 0.06% to maximum 2.00% carbon)
High-Carbon Ferrochrome (maximum 6.00% carbon)
High-Nitrogen Ferrochrome
Chromium Metal
Chromium-Copper
Miscellaneous Chromium Alloys

CALCIUM
Calcium-Silicon
Calcium-Aluminum-Silicon
Calcium-Manganese-Silicon

ZIRCONIUM
12 to 15% Zirconium
35 to 40% Zirconium
Aluminum-Zirconium

SILICO-MANGANESE
All grades including Silico-Spiegel

MANGANESE
Standard Ferromanganese 78 to 82%
Low-Carbon Ferromanganese
Medium-Carbon Ferromanganese
Spiegeleisen
Manganese Metal
Manganese-Copper
Miscellaneous Manganese Alloys

SILICON
Ferrosilicon 15%
Ferrosilicon 50%
Ferrosilicon 75%
Ferrosilicon 80 to 90%
Ferrosilicon 90 to 95%
Refined Silicon (minimum 97% silicon)
Miscellaneous Silicon Alloys

VANADIUM
All grades

BRIQUETS
(Patented)
Chrome Briquets
Manganese Briquets
Silicon Briquets

COLUMBIUM

TUNGSTEN

Ceaseless research

KEEPS BETHLEHEM PRODUCTSL

For example

A new Bethlehem development

LEADING PRODUCTS OF BETHLEHEM . . . STEEL SHEETS AND STRIP . . . TIN PLATE . . . BARS AND SPECIAL SECTIONS . . . SEMI-FINISH
CATION AND ERECTION OF BUILDINGS, BRIDGES AND OTHER STRUCTURES . . . STEEL PLATE WORK AND CONSTRUCTION . . . STEEL SHEET, H- AN
NUTS—RIVETS—SPIKES . . . ALLOY STEELS . . . STAINLESS STEELS . . . TOOL STEELS AND TOOLS . . . FORGINGS . . . CASTINGS . . . PIG IRO
STEEL BLANKS . . . CAR WHEELS AND AXLES . . . TRACKWORK FOR STEAM, ELECTRIC, MINE, AND INDUSTRIAL RAILWAYS . . . STEEL FREIGH

TSLEADERS

IN THEIR FIELDS

t facilitates processing of steel

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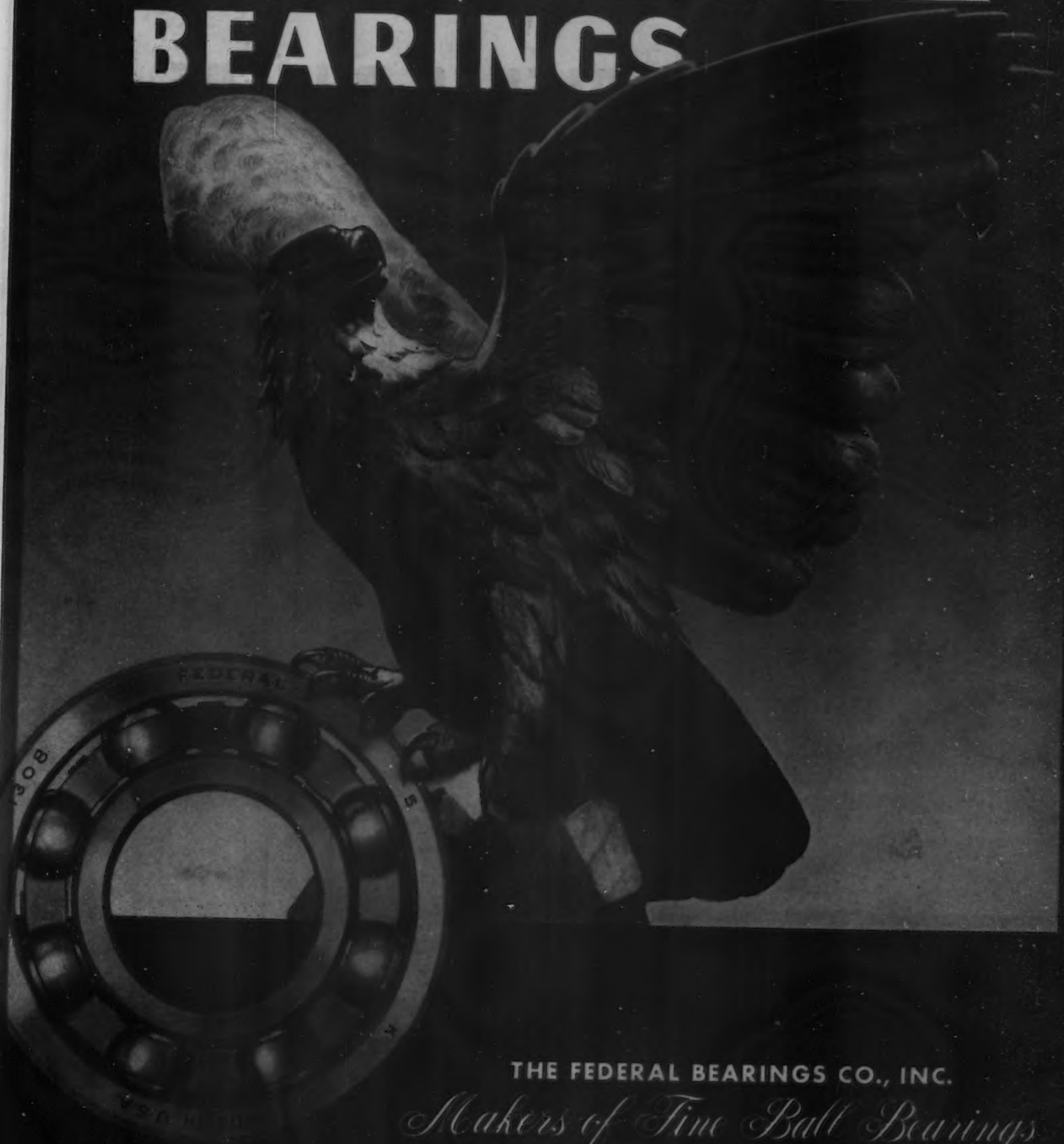

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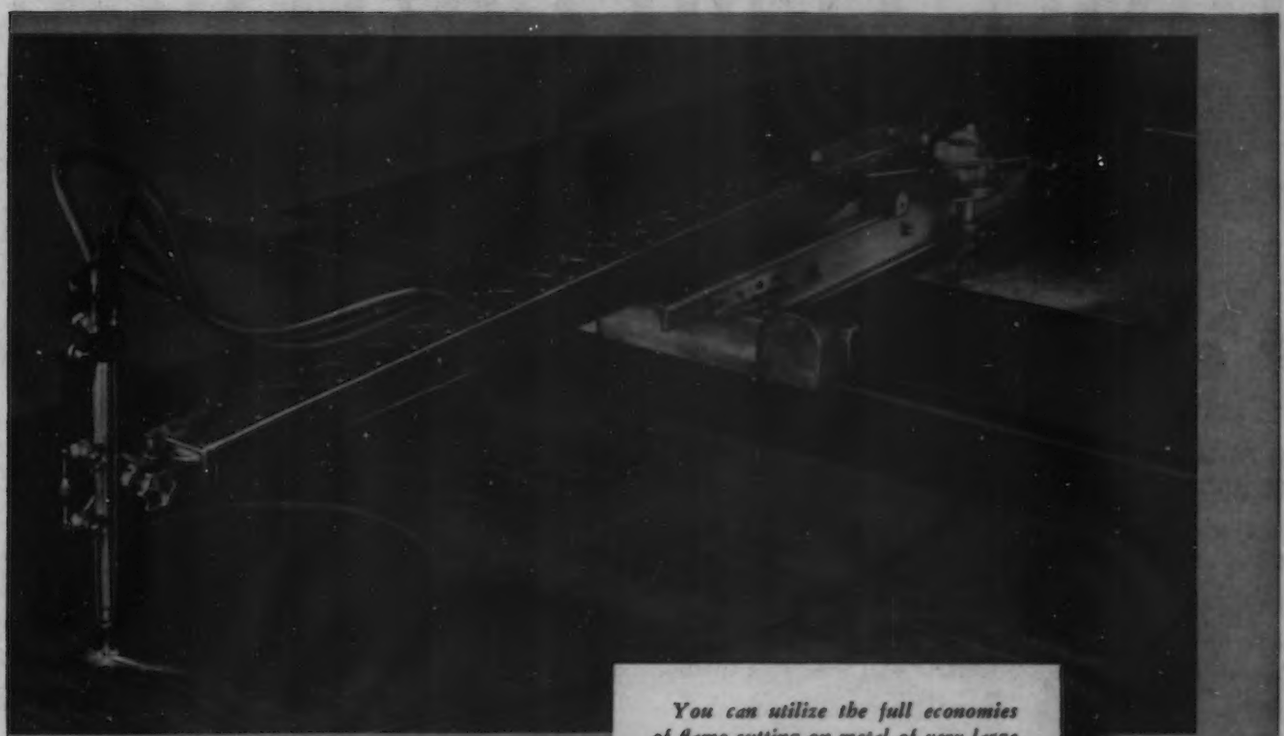

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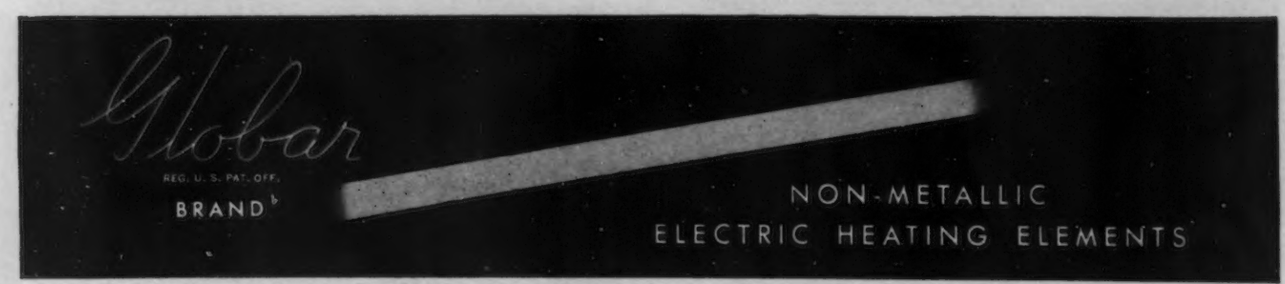

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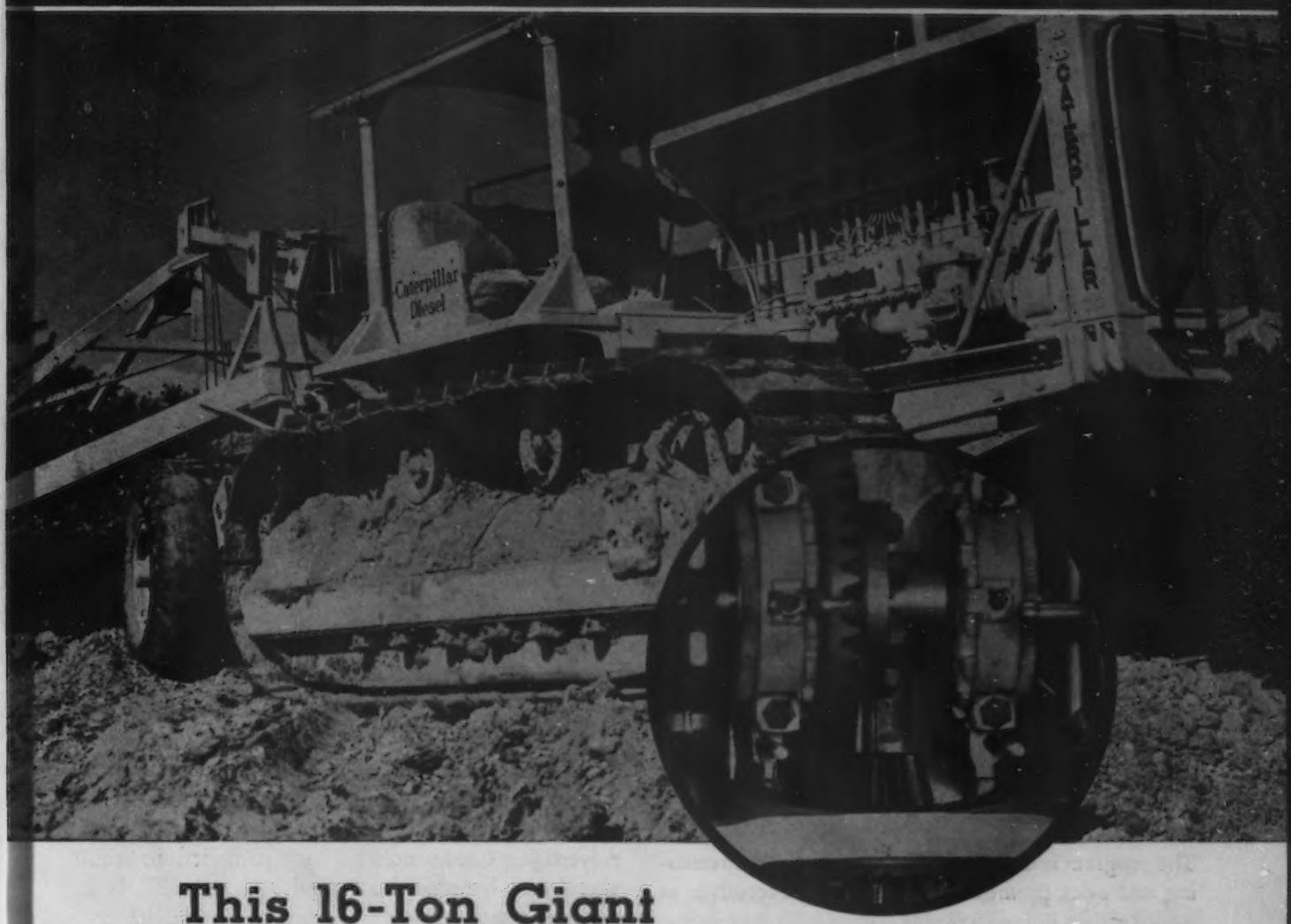

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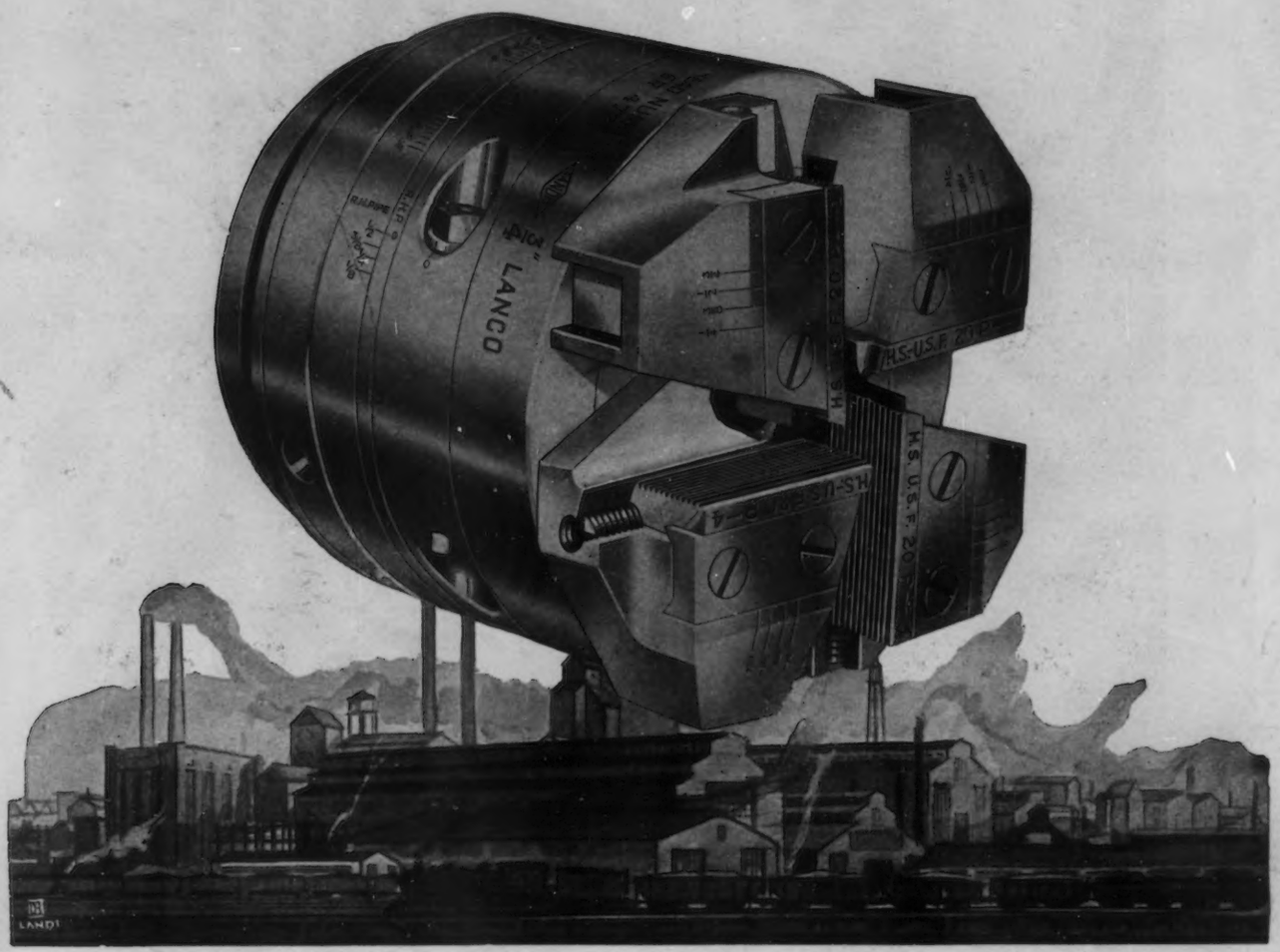

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THE IRON AGE

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Alloy Steels

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August 12, 1937

ESTABLISHED 1855 Vol. 140, No. 7

The Modern Three R's

WHEN most of us went to school, the three R's that most concerned us were "readin', ritin' and 'rithmetic."

But times have changed. The world has progressed, in which direction nobody knows, and today the three R's are Recovery, Reform and Revolution.

More people are studying these three R's today than are studying the more prosaic and fundamental originals. Of course it is assumed that readin' and ritin' have preceded study of the more advanced three R's, and there is evidence in plenty to substantiate this belief. But arithmetic certainly has been overlooked.

Take the case of recovery. Many people think that recovery has been accomplished in America. Certainly the Administration must think so, or it would not be taking the second and third steps.

As a matter of fact, plain arithmetic would tell us that as a nation, we are further away from recovery than we were at the start, the middle or the end of the depression.

Any man or woman who in casting up accounts found that he or she was spending twice as much as his or her income could not say that the personal depression was over or that he had made much progress toward financial recovery.

The same thing is true of the nation. So long as the national debt is steadily increasing, month after month and year after year, it is foolish to talk of national recovery as an accomplished fact. Recovery will start the minute national income exceeds national outgo and not before.

Arithmetic, and the most elementary kind of it at that, should convince any one of this fact.

But arithmetic, in Administration circles, seems to be a lost art. Reading and writing are easier to handle. Let's forget the cold facts of arithmetic, forget that we are going deeper into the hole day by day as a nation and take up the subject of reform.

But whom shall we reform? Shall it be the politicians, who make use of position and power to appoint relatives to lucrative offices and who devise schemes to levy tribute on private and corporate funds that would be tantamount, in commercial life, to criminal extortion and blackmail?

Shall it be the labor racketeer, whose disregard for law and order and human rights transcends the moral indifference of the thug and highwayman?

Oh, no! These are too tough assignments. Let's reform the employers of labor.

And what if we fail to impress the public that what we thus accomplish in reform is worth political support? Well, we still have the third modern R to fall back upon!

When a nation fails to pass its arithmetic test, it is heading for trouble.

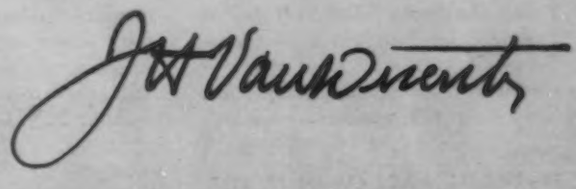

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FIG. 1—The latest of the Ford village industries is housed in a well-built, air-conditioned structure equipped with the most modern machinery available. This Northville, Mich., valve plant draws its 400 workers from the surrounding countryside.

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Ford Modernizes Northville Valve Plant

o o o

By FRANK J. OLIVER
Associate Editor, The Iron Age

o o o

IT was 16 years ago that Henry Ford began to put into practice his conception of the need for a closer alliance between the farm and factory, which would move industry back from the crowded cities into the country, alongside the farm. The Northville valve plant, located in an abandoned village factory, 30 miles from the great Ford Rouge plant at Dearborn, Mich., was the result. Today the first of the "village industries" has outgrown its swaddling clothes, and has been replaced by a modern one-story plant employing 400 workers.

When Henry Ford set up the small plant in which motor valves were ground, finished and inspected, he turned the spotlight of public interest on an experiment of far-reaching importance. How well this village industry did its job is told in figures. In its 16 years of operation, the original Northville plant produced more than 181,000,000 valves.

The new plant, air-conditioned and equipped with the most modern machinery, has 30,640 sq. ft. of floor space compared with 24,240 sq. ft. in the old building, formerly the quarters of the once bustling Dubuar Mfg. Co., a wood mill making fence posts, screen doors and similar products.

The plant, originally built in 1883, was destroyed by fire in 1896 and the 3-story brick building that replaced it was taken over by the Ford Motor Co. and rehabilitated and equipped in 1920 with machinery moved from the then main plant at Highland Park. Experienced workers from the big plant first operated these machines, but as time went on, men from the village and surrounding countryside were put to work at regular Ford wages. At present most of the workers employed here live on small farms of two or three acres

in this picturesque countryside. Hardly a married man in the shop is without a large Ford garden plot, and a number till several acres. They drive in from within a radius of 10 miles. Thus security is produced by a combination of the machine and the farm in line with one of Mr. Ford's industrial and social policies.

There is an atmosphere of quiet beauty about the Northville plant. Added to the architectural attractiveness in its carefully landscaped setting is an artificial lake, formed by the damming of the River Rouge. An overshot wheel, operated by water piped under wide lawns, serves as part of the power-developing equipment of the plant. The main plant power, however, is supplied by an ultra-modern 750-kw. turbo-generator operating under 1000 lb. pressure at 900 deg. F.

At the new Northville plant one-third again as many machines were stationed as in the old building, and additional employees were hired. Today the new equipment and increased force turns out 70,000 Ford valves in 16 hr., a total reached in 24 hr. before the change.

Work actually done at Northville consists of grinding, finishing and inspection of valves used in Ford cars and trucks and Lincoln-Zephyr passenger cars. The rough chrome-nickel steel castings, poured in the Rouge foundry, are brought in by truck and are shipped back finished to the motor assembly departments. Transportation costs are low, and the experience of the company has proved that it is no more costly to manufacture in the country than under one roof, along with other processes.

Many of the grinding operations are performed in centerless machines, of which there are 65 in the plant. Fig. 2 shows a view down the center section with the covered coolant trough in what appears to be the central aisle. Used coolant is discharged through this trough to a levergating settling tank outside the building and is screened and pumped back through the system. About 3500 gal. of 25 per cent soluble oil are kept in circulation by a centrifugal pump in the basement operating under an 18-lb. head. Steam coils keep the temperature around 90 deg. F. and prevent separation of the emulsion.

First two operations are to rough grind the stem in a centerless machine, removing 0.006 to 0.010 in. of stock. The work is loaded by the head end in a slotted fixture that by rack and pinion motion flops over the valve 90 deg. into position between the grinding and the pressure wheels. A similar set-up is used for the semi-finishing and finishing operations later on.

A centerless type machine with drum-type fixtures, Fig. 3, is used to grind the mushroom type valve feet. As can be seen, the valves are loaded by hand, head up, locating from the stem. An endless belt wrapped around the drum serves both to clamp the work and to revolve the fixture. In the grinding position the valves are rotated by an inner work wheel with vertical axis, not shown.

To aline the head with the stem, the valve is heated and restruck in a standard heading machine. This operation, Fig. 4, is entirely automatic. The valves are transferred by hand to a slot conveyor which takes them through a gas-fired heating furnace (1425 deg. F.), from which they are discharged by

AT RIGHT

FIG. 3—The mushroom type valve foot is ground on the o.d. in this centerless machine with drum fixture and clamping belt.

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BELOW

FIG. 2—Battery of centerless grinders, of which there are 65 in this plant. The central covered trough conveys dirty coolant to an outside settling basin, from where it is recirculated.

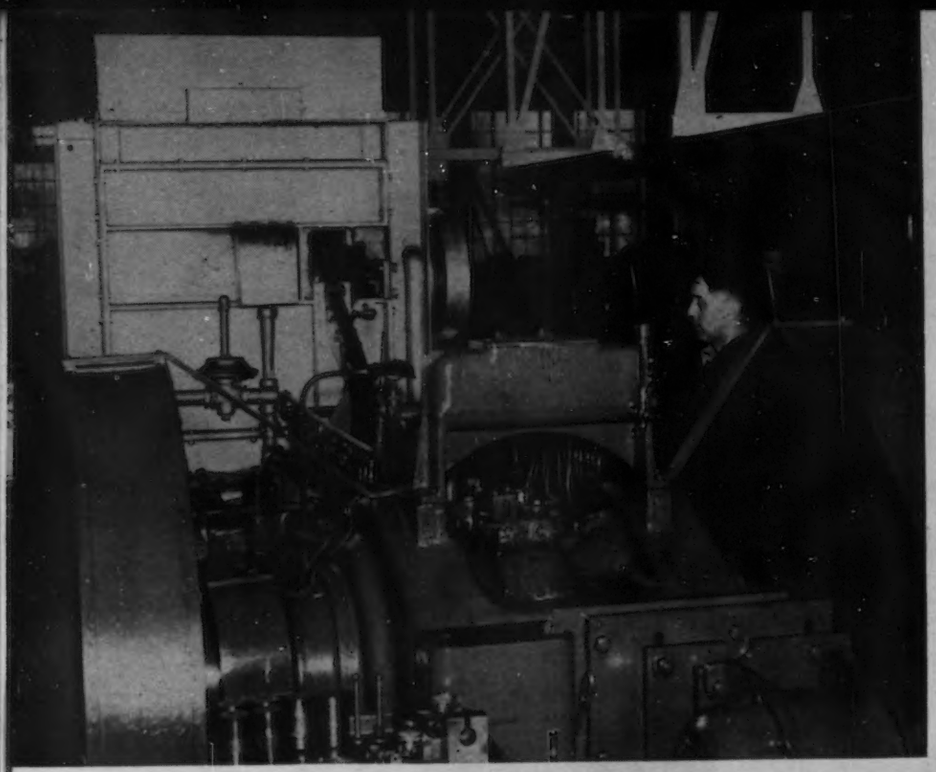

FIG. 4—Preheating of the valves for the head restriking operation performed in this heading machine is carried on in the conveyor-type furnace in the background, a gas-fired unit.

o o o

gravity chute to the heading machine. This unit operates continuously and discharges the seated valves to a roller chain conveyor which brings them to the next machine. Here the head and foot are each ground to an overall length within 0.005 in. This is a continuous type machine with five grinding wheels operating on the head and three on the foot. Division of load between wheels and correction of wheel wear is facilitated by individual ammeters on each motor. Fig. 5 shows the loading end, as well as the discharge end of the unit. There is an endless chain fixture made up of linked carriages each having three individual latch-type fixtures. The valves are loaded loosely in place and when the carriages pass through the work tunnel, clamping is effected through a pressure rail bearing on spring pads on top of the latches.

A series of centerless grinding operations follows. In the first, the stem and foot o.d. are rough ground simultaneously in a machine with a stepped wheel and cam contour diamond wheel-dressing device. A few stations further on, the operation is repeated for the semi-finish grind. In the second, the o.d. of the head is finished in a grinder having a drum fixture of

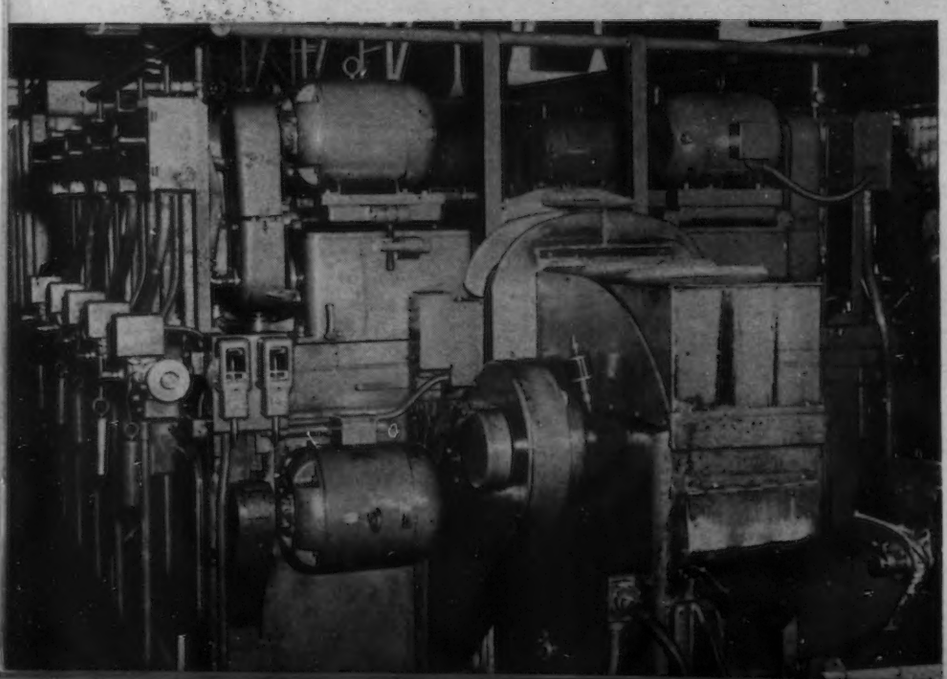

FIG. 5—Rough grinding of the head and foot to length is accomplished in this 8-wheel automatic machine. Individual ammeters facilitate adjustment for wheel wear so as to equalize the cut and load. The close-up (above) shows the latch-type fixtures just before entering the clamping tunnel.

o o o

the same design as shown in Fig. 3 for grinding the o.d. of the foot. Chamfering of the foot is accomplished with a simple hand fixture. Grinding the radius between stem and foot is another centerless grinding operation, performed in a machine having a formed wheel.

Loading is by hand without a fixture other than an end stop.

Just prior to this form grinding, the top of the valve head is polished by paper abrasive tape. A drum-type fixture, plus the tape-feeding mechanism are mounted on the base of a standard single-spindle drill press which furnishes the drive to fixture, tape reels and work spinning device. Spinning of the valve takes place intermittently and through friction on the foot face when pressure and rotation are applied from below.

Rough grinding of the 45-deg. angle on the head is an operation accomplished by chucking the valve

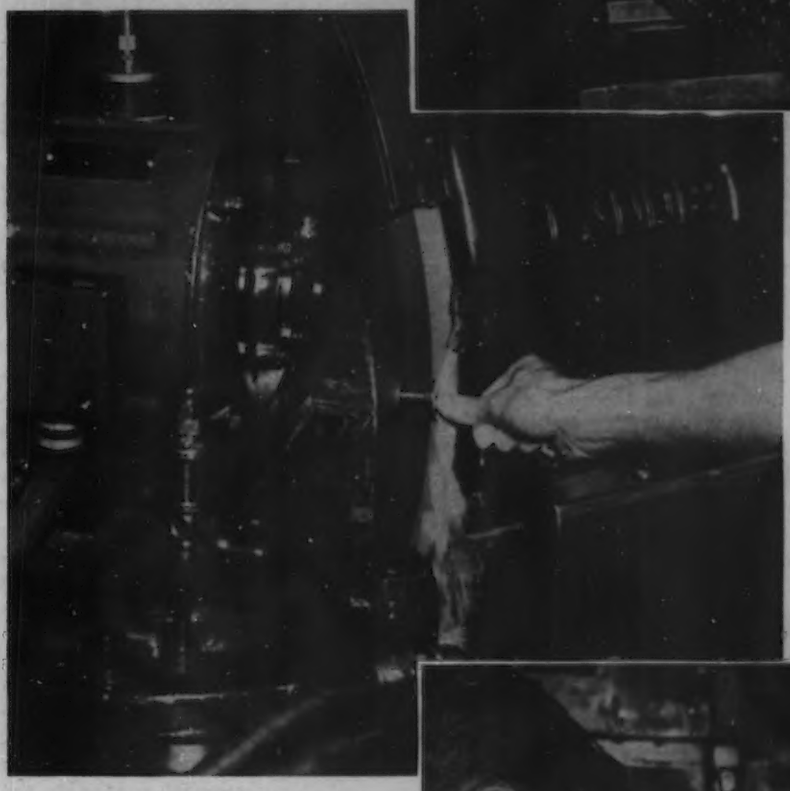

FIG. 7—Loading and automatic discharge station of a large horizontal drum-type, double-head grinder for rough and finish grinding the face of the foot to length from the 45 deg. seat. The stem is supported in two pairs of roller trunnions.

o o o

in air-operated collet chuck and reciprocating the 30-in. diameter grinding wheel, which grinds on its periphery. Work head is advanced into operating position hydraulically. For the finish grinding of the seat, full hydraulic machines have been purchased in

ABOVE

FIG. 6—Finish grinding of the 45-deg. seat is being done in this fully hydraulic grinder, including a hydraulically actuated collet chuck.

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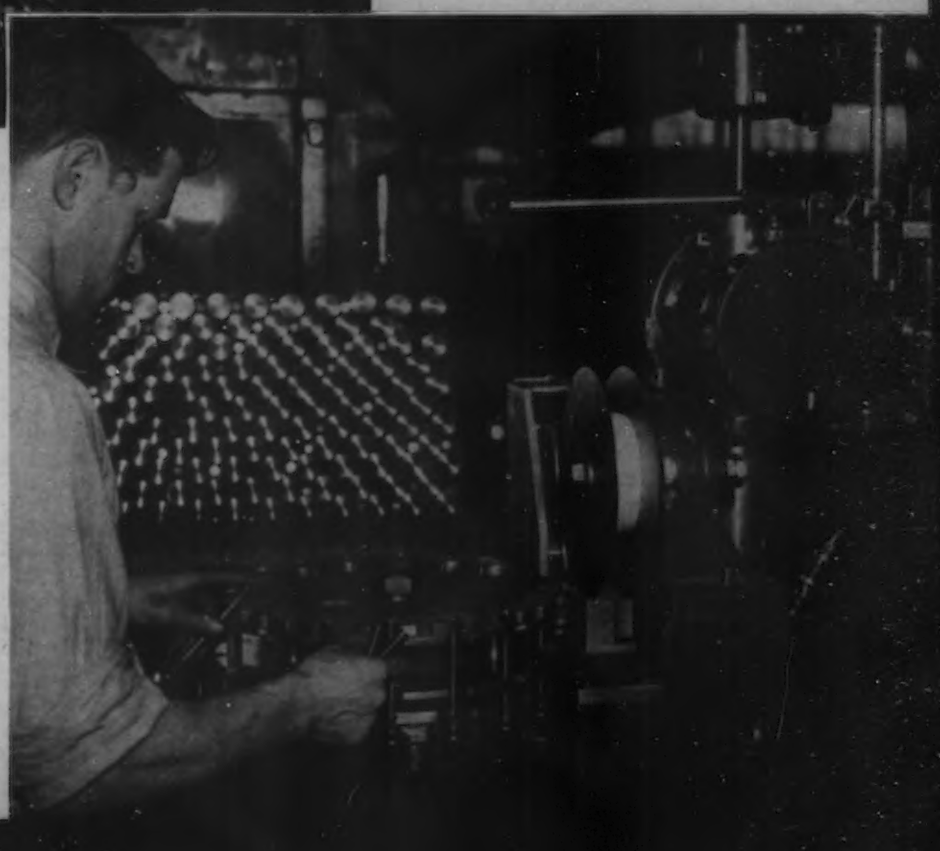
AT RIGHT

FIG. 8—Polishing the valve feet is effected by abrasive tape on reels actuated by a special fixture mounted on a standard single-spindle drill base.



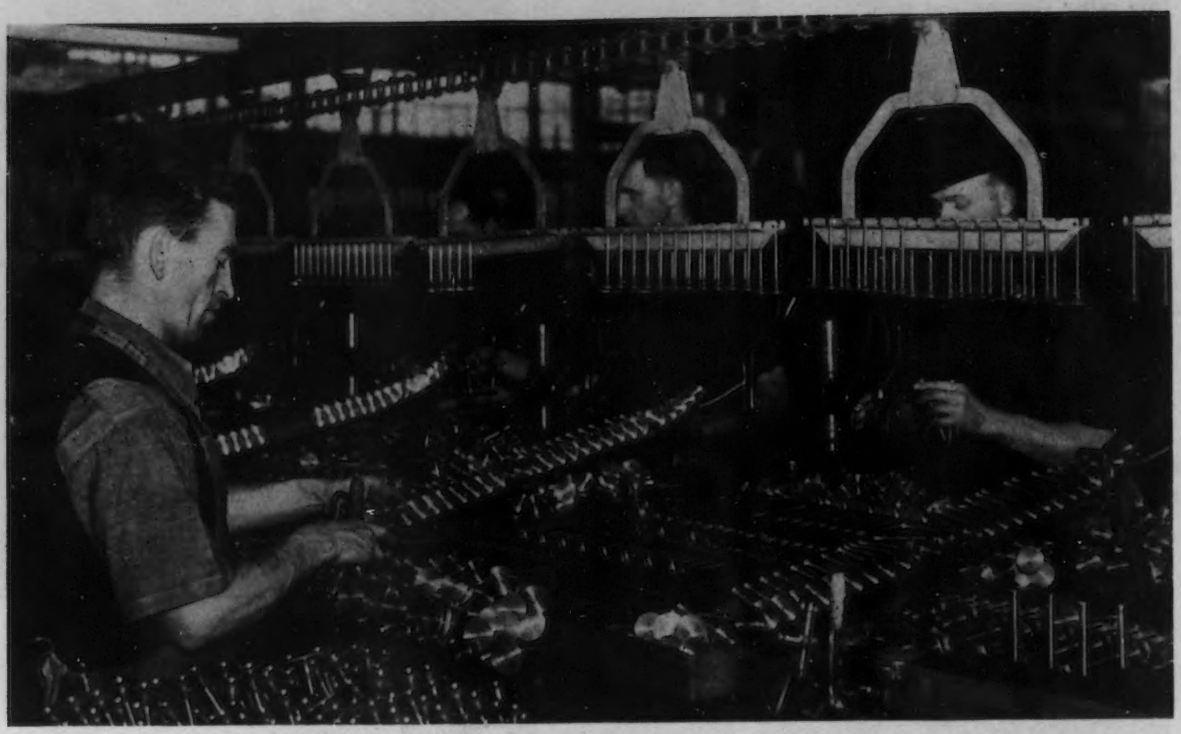


FIG. 9—All valves are inspected 100 per cent for stem runout and o.d. (separate operations) on visual gages and for runout of seat and face of foot by dial gages. Segregation for length takes place in a constant-temperature room.

which even the collet is actuated by oil hydraulic power. An electric solenoid brake brings the work head to rest upon withdrawal of the wheel. Fig. 6 shows this set-up.

Between the rough and finish grinding operations on the seat, the stem is finish ground on a centerless machine to tolerances of 0.0002 in. on out-of-round and 0.0005 in. on size. At this point also the name Ford in script is stamped on the head in an automatic machine with drum fixture.

Locating from the finish ground 45-deg. seat, the foot is then ground to length in a fully automatic machine that incorporates a large drum-type work-holding fixture rotating in a horizontal plane above the rough and finish wheels. These wheels are mounted on vertical motor driven spindles, and the final size tolerance is 0.001 in. In this operation the stem is automatically clamped against two pairs of hardened rolls which act as Vs and which can be turned to a new position when worn. A mechanical arm with fingers picks off the finished stem and deposits it in a chute leading to loading racks.

Polishing of the foot is accomplished with paper tape carrying 100-grit abrasive. A simple drum fixture is employed and the tape drive and indexing mechanism is driven from the spindle of a drill converted to this purpose, similar to the machine for polishing the head, the only difference being that a coarser grit belt (60 grit) is used in the latter. Fig. 8 shows this set-up.

One hundred per cent inspection follows, but first the valves are thoroughly cleaned in a solvent degreaser of the tri-chlorethylene type. Stem runout is checked under visual gages while turned by hand in roll-type Vs. Power is used to revolve the piece when runout of the seat and foot face is checked on two dial gages reading to "tenths." Visual gages check the o.d. of the stem, with an allowance of 0.0005 in. for intake valves and—0.0005 in. for exhaust valves. To check the length, the tote boxes are held in a room maintained at a temperature of 72 deg., and after sufficient interval, the valves are measured there by dial gages, locating from the 45-deg. seat. Stems are segregated according to length in steps of 0.001 in. Matched and labeled valves are laid in racks which are loaded 10 high in closed boxes for truck shipment to the Rouge plant. In motor assembly, the plus size stems are mated with the minus size push rods, since the Ford design incorporates no adjustment feature of valve tappets.

Coke Output in 1936 Gained 31.5%

THE largest yearly gain in coke production ever recorded by the United States Bureau of Mines occurred in 1936, according to figures just issued, in which it is shown that 1936 output of by-product and beehive coke was 46,275,184 net tons, a gain of 11,135,923 tons over the 1935 total, or about 31.5 per cent. The 1935 total was 35,141,261 tons. While the largest increase was in the by-product grade, beehive production also was up substantially, from 917,208 tons in 1935 to 1,706,063 tons in 1936.

The average spot price realized on Connellsville coke, f.o.b. ovens, was $3.68 per net ton, a rise of 7c. over the average of 1935, and 9c. under the figure for 1934.

Consumption of foundry coke rose from 1,484,453 tons in 1935 to 1,921,817 tons in 1936. Demand for domestic coke, after showing a decline in 1935, rose in 1936 to 10,021,343 tons.

GEORGE T. LADD, President, United Engineering & Foundry Co. Drawn by John Frew for The Iron Age.

Benefits From Reorganized Tool Stockroom

A recent reorganization of the tool stockroom equipment and system at the Endicott, N. Y., plant of the International Business Machines Corp. is of interest because of the substantial benefits derived. Stock clerks are locating tools in one-quarter of the time formerly required, and a space saving of 50 per cent on small items and of 15 per cent on larger items has been realized, an important consideration in a rapidly expanding organization where space is at a premium.

Under the former system, which was far from antiquated, there was a constant demand for more tool stockroom space because the shelves were overcrowded, but today in the same floor space there is plenty of room to handle additional requirements for some time to come. The inherently dangerous ladders have

By WALTER F. TITUS
Vice-President, International Business Machines Corp.

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been eliminated as there are no tools stored out of reach, on top of racks; and tools are receiving much less damage in storing than previously, resulting in a very substantial money saving.

Because of the wide variety of products manufactured at the Endicott plant and the requirement for utmost precision in the manufacture of the electric bookkeeping

o o o

IN the recently reorganized tool stockroom at the Endicott, N. Y., plant of the International Business Machines Corp., Rotobin steel storage equipment of various types is effectively employed.

and accounting machines, time recording devices, and similar complex and highly accurate devices produced, the efficiency of the tool stockroom is an important factor in the operation of the plant. It contains between 60,000 and 70,000 individual tools, such as jigs and fixtures, serving out and receiving back between 200 and 300 each day. Usually a single tool of each kind is sufficient stock.

In addition, it carries between 1700 and 2000 types of expendable tools such as drills, reamers, taps, counterbores, milling cutters, saw blades, files, etc., stocking anywhere from one to 600 of each. About 150 calls for these items are received daily.

Under the new system, a foreman and seven clerks now conduct the work of the department and maintain the stock in perfect condition as to amounts, condition and

Tool No..... Part No.....

Tool Name.....

Operators No.....

Date..... .....
Foreman

FIG. 1—Tool request form, which is placed in the tool storage space until the tool is returned to the stockroom.

order. A new type of storage shelves and bins has been installed, the principle of which is the rotating shelf mounted on a vertical shaft. Seven or eight such shelves may be mounted on a single shaft, each capable of being revolved by the clerk until the compartment he is seeking is beforc him.

Each tool is numbered, a card in the tool file showing the tool number, the number of the part that it makes, and its location in the stockroom. The machining room foreman consults the routing sheet to ascertain what tools will be required to make a certain part. He sends a tool request card (Fig. 1) to the stockroom, indicating the number of the tool he needs.

The file clerk takes the card from the tool file and gives it to the stock clerk, who notes, as an example, that the tool is to be found at 54-F-6, or drawer No. 6 of shelf "F" in vertical section 54, the latter being marked by metal tabs along the aisles.

When the stock clerk removes the tool, he leaves in its place the tool request card, which is destroyed only after the tool is returned. In this way, without making any further record, the location of the tool is known, even though it may be in use in some machining department. In addition, by checking the tool number with the request card when the tool is returned, the possibility of misplacing a tool is eliminated.

If a tool needs resharpening or repair, the foreman attaches the form shown in Fig. 3 and sends it to the stockroom, whence it is sent

DATE ORDERED | DATE WANTED

PART NUMBER ..... (1) TOOL NUMBER ..... (4) TOOL NAME—DESCRIPTION

DATE COMPLETED (2)	TYPE TOOL	(3) ORDER NO	DEPT CHG	APPRO. NO	EST. HRS	ACT HRS
RETIREMENT DATE (5)	EXPECTED LIFE HRS	(6) OTHER PARTS PRODUCED				
COST (7)	MONTHLY DEPR	(8)				
DIVISION—PRODUCT (9)	SOURCE OF TOOL	(10) MANUFACTURER				LABOR
OPERATION (11)	DEPT USING	(12) ADDITIONS OR ALTERATIONS				BURDEN
MACHINE GROUP (13)	DATE INSPECTED					MATERIAL
DATE OBSOLETE (14)	ENG. CHANGE NO					TOTAL

FOREMAN

PART NO	DATE C	T T	TOOL NO.	RETIRE.	LIFE	COST	NO. DEPR.	DIV.-PRO.	S	OPER.	DEPT	MACH	OBSO.

IBM 529925 LICENSED FOR USE UNDER PATENT 1,372,482 SPECIAL TOOL INVENTORY—I. B. M.—ENDICOTT

ABOVE

FIG. 2—Form for repair or sharpening of a tool found to need attention during a job.

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AT LEFT

FIG. 3—Form used with tools which require repair or sharpening after use.

FORM 493A

IMPORTANT

THIS TOOL MUST BE DELIVERED TO TOOL INSPECTION DEPT. FOR CHECK BY TOOL CRIB.

PART NO.....TOOL NO.....

TOOL NAME.....

TROUBLE.....

.....

.....

.....

(OVER) INSPECTOR.....

to the tool room for repairs or to the grinding department for sharpening, after entry has been made on the file card for the tool number. If such attention is needed during a job, the foreman fills out

a tabulating card (Fig. 2), which gives it preference over all others so there will be a minimum of delay.

When the tool has been made ready for use, the form shown in Fig. 4 is attached, signed by the inspector, and kept with the tool until the inspector approves the first piece turned out by it on the next order to be received.

These improvements add to the safety and convenience of our workmen, as well as to their producing and earning power. They also enable us to give faster and better service to our customers, not only in the maintenance of existing products, but in the construction of new ones.

THIS TOOL **O. K.** FOR NEXT ORDER

PART NO._____ TOOL NO._____

ORDER NO._____ DATE_____

IF LAST PIECE ON ORDER CHECKS O. K. FASTEN THIS CARD SECURELY TO TOOL. CARD MUST REMAIN WITH TOOL UNTIL INSPECTOR APPROVES FIRST PIECE ON NEXT ORDER.

INSPECTOR_____

FIG. 4—This form accompanies the repaired or sharpened tool until its good condition is proved by satisfactory performance.

New Special Paper Roll Handling Truck

A NEW telescopic fork-lift industrial truck especially designed for the rapid and economical handling of rolls of paper or similar materials ranging up to 5,600 pounds in weight is shown in the accompanying illustration.

This truck is of the two front wheel drive, two rear wheel steer type, with the control station in the center. The overall length of the truck is 162½ inches when equipped with 54-in. forks as shown. Such forks enable loads up to 60 in. in diameter and 80 in. in length to be handled. The forks are adjustable center to center by means of a demountable crank which moves them through a rack and pinion arrangement.

The telescopic lift, actuated hydraulically, permits a fork travel of from 12 inches above ground to a height of just over 92 inches, making it possible to stack 60 inch rolls three high.

The battery power assembly is housed in a demountable box compartment. This box compartment may be removed easily if it is desired to replace the batteries with a gasoline-electric unit power source.

The drive axle is of the double reduction spiral bevel and spur gear type, and the rear, or trailing axle assembly is of the compensating caster type. Steering is through a Ross cam and lever arrangement, with the control mounted on a vertical steering wheel.

This truck is manufactured by the Mercury Mfg. Co., of Chicago, Ill.

MERCURY telescoping fork-lift truck especially designed to handle rolls of paper or similar material, up to 60 in. diam., 80 in. long, and 5,600 lb. in weight.

A Methods Engineer

By WILLIAM R. HOWELL
Methods Engineer, S.K.F. Industries, Inc.

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FOR several years it has been my duty to conduct tests with newly developed machine tools, as well as belts, pulleys, cutting oils and various other accessories, for the purpose of seeing whether the use of these articles, in place of the present ones, might either reduce costs or speed up production, preferably both. This work offered an opportunity to observe the selling technique of the many salesmen contacted and to compare their methods.

A carbide inserted tool will be made up and left for test without knowing whether the lathe is capable of obtaining the necessary surface speed. A new type of drill will be left for test without anyone being told just exactly what feed can be used with it. Tool holders will be designed after a hasty glance at the application, only to be sent back to the factory of the selling company when one dimension is found to be off. Or else a sales engineer will observe a test and then not be clear and perhaps exaggerate a little in the report, thereby breaking down all faith and ruining sales which that special tool and company rightly deserve.

It would not be such a serious matter if procedure such as above was not repeated, but when it happens time and again it becomes a different story. This article is an analysis of some of these problems, not from the point of view of the salesman, but from that of the buyer, who is on the inside looking out.

There is no doubt that many machine tools that are over several years old, either in material or design, should be replaced by one of the many developments that are now found on the market. But this cannot be done as easily as all that, and the reason is primarily one of breaking a habit—the habit

of the user. Even in spite of better anticipated performance, it is hard for anyone to break away from the use of a tool that has been tried and tested, and that is looked upon as an old friend.

So the real problem is a psychological one of breaking a habit, then replacing it with a new habit. This goes for the highest executive all the way down the line to the machine operator, in fact the difficulty increases with the descent, on account of the decreasing amount of imagination that is often found when you descend the scale of authority.

There are three points that every tool salesman should be familiar with and there is no excuse for not knowing them because they can be acquired by burning the midnight oil, namely:

1—Know you own product.
2—Know the machines on which your product is to be used.
3—Know your competitor's products.

You should know every point of advantage and disadvantage that your tool or product may possess. Your tool may only consist of a new development in design, or a change of formula, but you should be familiar with that development and know what it means and the reasons for it, both practical and technical. So often it seems that a tool salesman will know as little about his product as a salesman who one week is selling vacuum cleaners and the next refrigerators. You are not selling to housewives when you enter a plant.

You should know equally as well what your tools cannot do. Tools are becoming more and more single purpose, similar to machinery, and this fact is appreciated by factory executives, so only tell the true story about your products. You have to slip just once, and the door will be closed to you as well as anyone else representing your company.

It is quite important that a salesman understands machinery. It is not hard to learn the basic construction of a lathe or screw machine, miller or shaper, yet it is surprising how many salesmen will suggest that you do something, which is impossible to expect it to do. With carbide tools for example, that have to be held rigid, many lathes have to have the ways

Analyzes Tool Selling

tightened or some other adjustment made before they can operate properly.

Never forget that your tool is not the only one on the market. The chances are that the man you interviewed has been contacted before by a competitor, and may know a great deal about that product. In order to sell him then, you have to make a comparison between the two tools, pointing out of course the superior points that yours may have. There are so many fancy coined names given to tools now, that it is quite confusing when you try to distinguish between two steels, one of which might be called "Hot-O" and the other "Cold-Ex," seemingly extremes, but perhaps very similar. Be a walking dictionary of these terms.

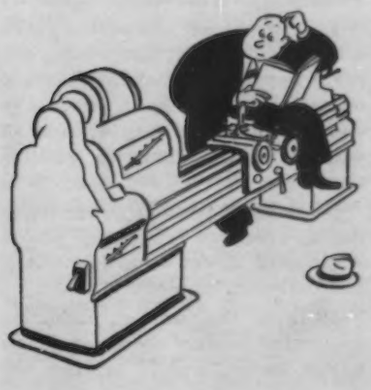
In fact the more you know about tools in general, latest developments in related fields and modern shop practice, the better you will stand in the eyes of your prospective customer.

This is rather fundamental advice when it comes to football, and it is of course based on the supposition that you first have to find who has the football. On a hidden ball play this is quite difficult, and the same analogy holds when you first call on a company. The ball carrier in this case is the person who has the final say about the purchase of tools. It may be someone in the purchasing department, the plant superintendant, the tool crib foreman or the methods engineer. The thing to do is to find out as soon as possible just who it is and devote the major part of your effort on him.

You will encounter much jealousy among the men of any organization that you may call on. Try to analyze this and find out who sides with who—you will probably find a distinct pattern—you may even have to do your selling several times.

Your main selling point is going to be on the performance of your tool on an actual production run in the shop of your prospective customer, so when this is being done, make sure that your tool or product is given a fair break.

It is rather dangerous to leave a tool for test, you cannot tell how it will be treated and if it does not come up to expectations, even though it is not the fault of the



tool itself, your chances for another test are of course diminished.

It is best for the tool company to furnish an observer, who, if he is clever and wise, will make it a point to show every important result to someone in authority in the plant so that the results will not be looked upon with suspicion.

It is advisable to win over the machine operator to your side as soon as possible. It is surprising how much damage can be done by an unsympathetic operator, especially when he or she may think that the adaption of the tool may mean a reduction in the rates. A practical advertising premium like a pencil or a penknife will do wonders, and an operator will certainly appreciate such a gift.

Remember that all plants are having "labor pains" at this time and anything that you can do to alleviate the situation will be a feather in your cap. There are even some plants that fear to try new methods and tools just on account of opposition from the help.

Make it a rule to find out what has been the previous practice of of the company on the type of work that your are experimenting with, for only by comparison can you show the advantage of adapting your tools. Do not exaggerate in your statements, let the facts speak for themselves.

The report should be brief and to the point, but complete from a detail standpoint. The various speeds and feeds, tool life and other factors, along with those of the regular practice for comparison, should be available for anyone who may ask for them. The dollars and cents savings should be the focal point of the report, and should be in a position to stand out by itself.

Don't be satisfied or expect the adoption of your tools after one test. Even though a quantity may be purchased and actually used, you should make frequent visits to see that the tools are holding up similar to the test and that they are being given a fair deal. Any one who may be opposed to them will find some excuse to discard them, as soon as your back is turned. If you have faith in your tools, as you should have, you need not be ashamed to make repeated calls, because only by repeat sales will you get a fair return for your efforts.

FIG. 1—Esterline-Angus graphic wattmeter. Makes a permanent record on a moving strip of fluctuations in power use by a single machine, or an entire plant.

Practical Methods of Reducing High Electrical Costs

o o o

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

o o o

Chapter 17 in a Comprehensive Series on the Economics of Industrial Power Transmission.

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THE high cost of electric power, as used in industry, bears little relation to the costs of generating that power. Lest that statement seem strange, let me say at once that its real meaning is this: The intelligent and economical application of industrial electric power lags far behind the intelligent and economical manufacture of electricity.

Marvelous forward strides have been made in recent years in the matter of reducing the costs of generating electricity. A power plant is considered hopelessly old-fashioned and inefficient now if it cannot produce a horsepower of energy at somewhere near the expenditure of a pound of coal, or its equivalent in other fuels. Utility central stations and large privately owned industrial power plants do considerably better than that. Even small industrial power plants nowadays manage to keep fairly close to that mark. As contrasted with the year 1892, when the average consumption of all utility central stations was around six pounds of coal per horsepower hour, this tells a story of great economic significance.

But in the matter of the application of power to the driving of machines, and in the related matter of the economical use of the power so applied, there are still enormously large grounds for improvement. It is, it seems to me, a fair statement that, if the application and use of electric power in industry were to be put on the same intelligent and economic bases as the manufacture of electricity, about one-third of the entire cost of industrial electricity would be saved.

In relation to other costs of manufacturing, such as labor, materials, management and the fixed charges on capital investment, the costs of power seem to be, on the average, small. For various types of industry they may range, however, all the way from 2 per cent to practically 50 per cent of the whole manufacturing cost. Probably a nation-wide average would come close to 10 per cent. But if three cents on the dollar can be saved by industry as a whole, simply by making more intelligent application and use of electric power, surely the effort is worth some consideration!

For purposes of analysis in this connection, let us assume that the cost of electricity at the meter (whether purchased from a public utility or generated within the manufacturing plant itself) is reasonable. From the meter on, then, we must determine these facts:

1—Is the electrical distribution system, as laid out in the plant, such as to serve all operating equipment adequately, and at the same time planned to conserve the use of power to the best advantage?

2—Is the operating equipment in the plant planned and laid out to produce the required quantity (and quality) of product with the least application of power consistent with every day needs?

3—Has production been scheduled in such a way as to use the full working capacity of the equipment installed, continuously?

4—If abnormal production peaks occur at frequent intervals, are there ways of re-scheduling certain operations so that high temporary electrical demands may be reduced without interruptions to production?

5—Have all possible power losses due to excessive friction or poorly engineered drives been determined and corrected?

6—Does the use of induction equipment produce operation at low power factor, and if so, has the

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FIG. 2—Two "before - and - after" Esterline - Angus graphic charts revealing faulty operation of a lead pump, and power use after the pump was repaired.

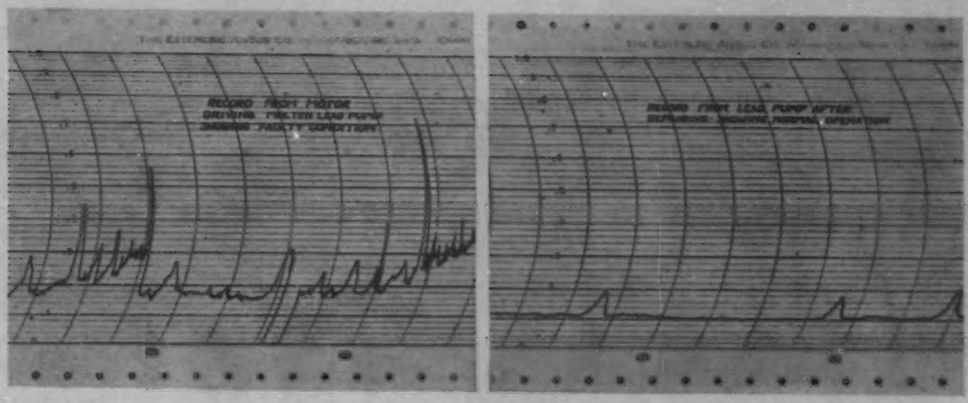

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FIG. 3—Analysis of the left-hand strip of these Esterline-Angus charts showed that a slight change in schedule would reduce demand peaks on these mixing mills.

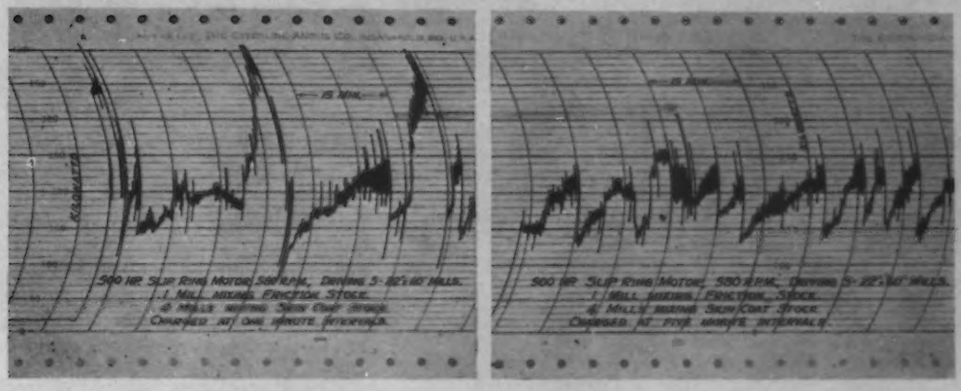

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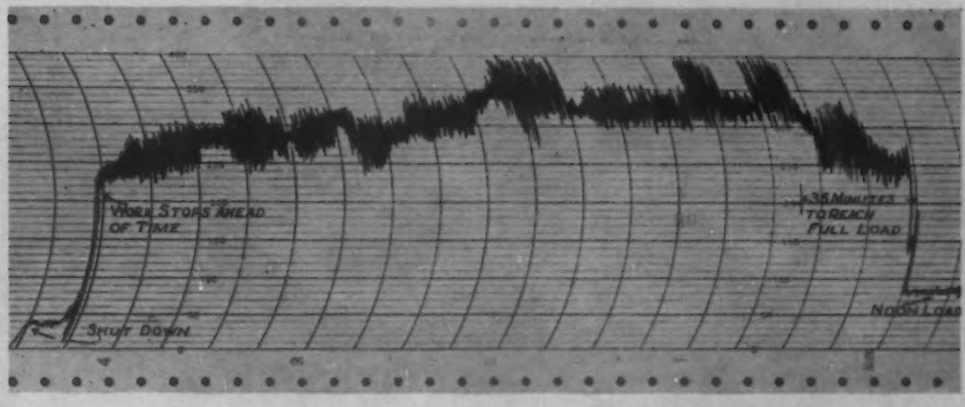
FIG. 4—An Esterline-Angus graphic record of power use in one industrial plant showed that quitting time was anticipated by almost thirty minutes each afternoon.



question of improving this condition been adequately studied?

7—Are machines and drives maintained in good condition, with frequent inspections, so that power wastes due to faulty equipment may be eliminated at once?

Management has been said to be composed of 90 per cent common sense and 10 per cent experience. Whether you agree with these proportions or not is beside the point; for neither common sense nor experience is sufficient alone to determine the correct solutions to all the problems which management faces every day in the industrial plant. Neither common sense nor experience can determine proper methods of machine operation without data—and data presupposes, in this mechanical age, instruments. Securing, largely through the use of indicating and recording instruments, the real facts about operating conditions is the first and most important step in successful management. Having the facts, common sense and experience will evolve the answers; without the facts, tangible results are unknown quantities. All of which is by way of introducing the subject of power surveys.

Through the medium of surveys made to determine the conditions of power application and the actual quantities of power used by production machines facts have been disclosed in thousands of industrial plants which have pointed the way to methods of remedying excessive losses. In a large majority of instances the clue which revealed the fact that something was wrong was found in the high ratio of maximum demand to normal plant load. Investigation of the reasons for a maximum demand out of proportion to normal plant load leads inevitably to an analysis of the seven questions listed above. These questions analyzed, invariably ways have been found to put a stop to many electrical losses, in some cases absolutely unsuspected before the analyses were made.

Now, a great deal of the savings which have resulted in various plants from the making of such

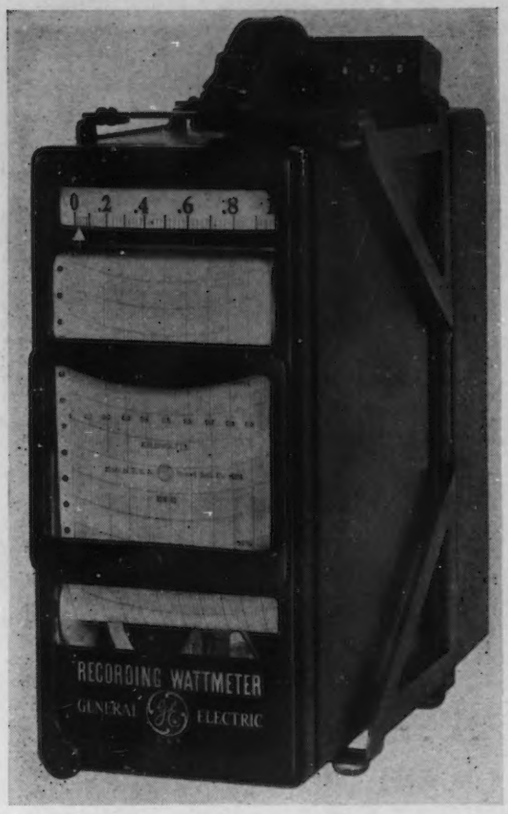


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FIG. 5—A portable General Electric recording wattmeter designed for power-use survey work produces a similar permanent record, automatically.

o o o

BELOW

FIG. 6—Westinghouse has put all necessary a.c. testing instruments for power use survey work into one portable case and named it an "Industrial Analyzer."

analyses have come through studying the characteristics of existing loads, operating machines more efficiently, staggering loads in different departments, regrouping machine drives, and checking the maintenance of operating equipment.

When the question of limiting excessive demand first comes up in any plant, the first idea that comes to mind is that of shutting down a portion of the operating equipment when the peak occurs, to keep the total load within a reasonable figure. But two factors arise at once to shut off any further consideration of this point. Many plants have their loads scattered into so many small units that it is not practicable to shut down any block large enough for effective demand control purposes, or else their main loads are essential loads which cannot be interrupted. And in most very large plants, while the power bill is quite an item and any saving made in it is well worthwhile, power cost is a small part of the total cost of the final product, and demand control dare not be instituted at the expense of interfering with the flow of materials through the plant, or interfering with the effective use of labor.

There are, of course, certain types of plants (a cement mill furnishes a good example) that have very large loads which can be picked up or dropped almost at will. Such plants are ideal for demand control work. In most plants, however, where there is a sequence of operations, or a flow of materials from one point to another which must be kept up continuously, or within certain periods of time, any attempt to drop major loads on short notice plays havoc with production schedules, and plant managers will not tolerate it for the sake of the small savings entailed.

As a result of these factors, one of the leading engineering firms specializing in power survey work finds that "successful demand control is usually accomplished by thoroughly surveying all the equipment in the plant, and then making small improvements here and there over the entire plant, which, when integrated together, make large demand savings. The two things which are of the greatest importance in this regard are the elimination of over-motoring of machines, and elimination of over-lapping peaks on cyclic operations."

Typical Instances

For instance, in a Mid-Western plant covering four city blocks, a line of roofing and insulating materials for building construction is made. Some years ago 3100 hp. of steam engines was replaced by electrical equipment. Shortly afterwards the electrical engineer in charge began to notice that certain loads were not properly distributed, and he wondered if anything could be done to improve operating conditions and at the same time to reduce the high cost of electrical power. With a graphic wattmeter he first took readings of the total plant load, and found that maximum demand was 1000 kw., and power factor 60 per cent. Following this, over a period of three years, every piece of equipment using power was tested, graphic wattmeter readings of the power used were obtained, operating schedules in department after department carefully studied, motors most properly suited to each unit or group of units installed (often by shifting existing motors to new applications), schedules varied, and many small improvements made, the bases for which were unknown until the survey disclosed them. After the studies were completed and the changes (none of which involved major equipment costs) were made, another graphic record of the total plant load was taken. In spite of the fact that the ton-

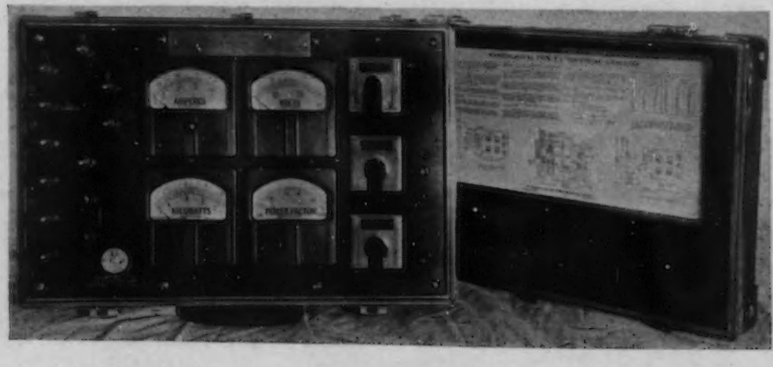

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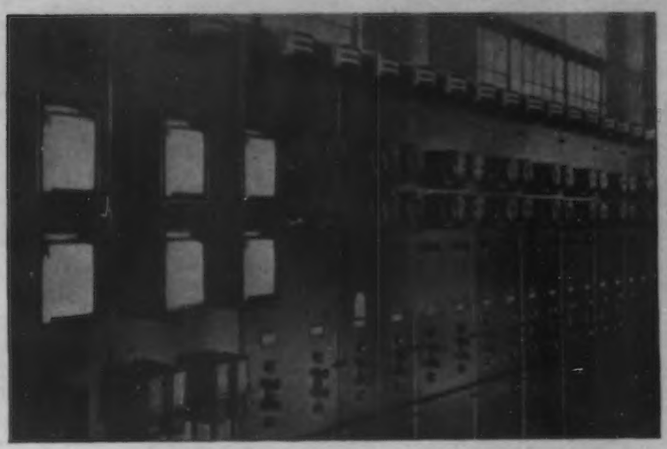
FIG. 7—The Westinghouse Industrial Analyzer for d.c. testing is even more compact and convenient than the a.c. testing set.

BELOW

FIG. 8—A bank of permanently connected Esterline-Angus graphic wattmeters installed in the Buick plant at Flint, Mich., checks power use continuously.



nage processed had meanwhile increased by 25 per cent, the maximum demand had been reduced to 850 kw. and the power factor raised to 87 per cent. The story is told in detail in issue No. 836 of *The Graphic*, issued by the Esterline-Angus Co.

Again, graphic records of plant load were made in a factory where the demand ran between 250 and 400 kw. Of particular interest to the management was the incontestable graph of production losses caused by labor. Records for afternoon work showed that, after the noon hour lunch period it took 35 minutes for the plant to reach full load, and quitting started about a half hour before the plant closed at 4.30 p. m., with the load dropping abruptly from 230 kw. to 40 kw. within a few minutes after 4 o'clock. The annual loss, computed on the basis of these records, was estimated at at least $30,000! The remedy in such a case lies in a bonus incentive to the workmen.

It is seldom that any one item makes a very large difference in production costs. Usually savings are the result of many small matters being corrected bit by bit. In one plant tests proved that, in changing over from direct to alternating current operation, motors on circulating fans could be replaced by much smaller sizes—a 15 hp. by a 3 hp., a 12 hp. by a 5 hp., and a 10 hp. by a 5 hp. Each load was thoroughly studied, and when proper sizes of motors were fitted in all cases, the aggregate result for a number of instances showed that the same work could be done with about one-third the former total connected horsepower, with much better power factor, and decreased demand.

An Eastern manufacturer purchasing power on a basis that imposed a penalty for operation below 95.6 power factor, paid a large sum each month for the privilege of operating at 64.7 per cent power factor. Tests showed two principal conditions at fault; a couple of second-hand transformers used for welding work were not well suited for the job, and other transformers and circuits were improperly loaded. A single new transformer with proper characteristics was substituted for the two old ones used on welding duty, and minor load redistributions gave a better balanced condition, higher efficiency and improved power factor (91.7 per cent). The resultant savings in the monthly power bill amounted to some $6,200 per year.

To save $20,000 a year in a medium size plant as the result of an investigation of power generating and power use conditions alone, is no mean achievement. Yet this was done in a leather tanning and finishing plant by checking operations with graphic instruments. With 485 hp. of connected load, the average maximum load on the generator was found to be 370 hp., and of this total, 87 hp. was due to lineshaft and belting losses. Other sources of avoidable losses were uncovered in a number of operations where machines were kept running *after* the work was done. It was easier, because of the location and type of control equipment used, for the operators to let them run rather than to shut them off—*they* did not pay the power bill! But electrical losses were not all; the same testing instruments pointed to a possible way to make better use of exhaust steam from the engines, and consequently more economical operation of the plant. A thorough steam survey was made, and the records of both the steam and the electrical surveys considered together in planning improvements which included a number of changes both in equipment and in management methods. The changes made, the operations showed an increased production profit of $20,000 per year.

Graphic Instruments

These few examples could be multiplied a thousand-fold and not tell the complete story. They are sufficient to indicate the fact that when the fundamental operating data are known accurately, it is possible to so improve the methods of application and use of electrical power, or to so change the schedule of operations, as to effect considerable savings in costs, in practically every manufacturing plant, without

(CONTINUED ON PAGE 119)

Modernized Machine Tool Drives by Multi-Speed Gearmotors

FIG. 1—A 5-hp. variable-speed gearmotor equipped with a 1750 r.p.m. constant-speed motor drives this 36-in. x 18 ft. engine lathe. Gearmotor speeds of 533, 776, 1142 and 1750 r.p.m. are obtainable. The drive pulley is 5 in. in diameter and the driven pulley, 23 in. Distance between pulley centers is 30 in. The gear shift handle has an extension for the operator's convenience.

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By H. RUDNICK

Industrial Service Division, Westinghouse Electric & Mfg. Co., Buffalo.

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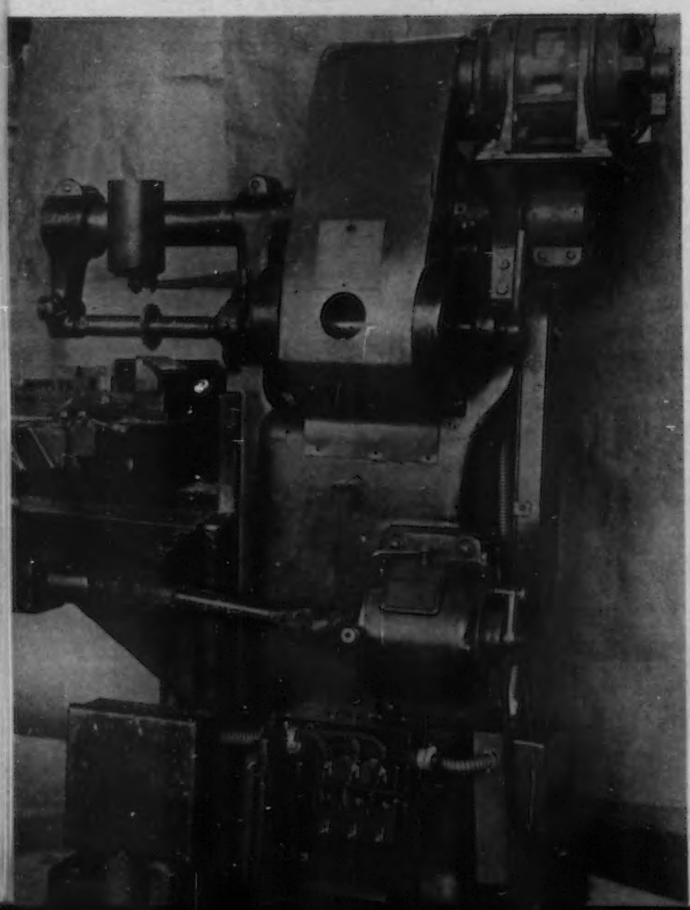

FIG. 2—The 3-hp. multi-speed gearmotor on this milling machine provides speeds of 353, 515, 756 and 1160 r.p.m. In this case the drive is through link chain belt.

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CONVERTING line-shaft driven machine tools for individual motor drive is a common problem in industry. Various methods have been employed, with varying results. This article deals with the application of four-speed reduction gearmotors as a satisfactory solution of the problem in one shop. A number of machine tools was involved, including several lathes, a milling machine, a radial drill and a horizontal boring mill.

Each new driving unit consisted of an adjustable speed reducer and a constant speed motor in a single compact unit, providing four different operating speeds at constant horsepower. It permits an extremely simple and highly efficient direct drive for individual operation of the machine tool and is especially adapted to converting line-shaft driven machines to individual motor drive. Merely by

moving the hand-lever on the exterior of the gear unit, operating speeds can be instantly increased or decreased while the motor is running at full speed under load and without affecting the horsepower output. Freedom from slippage and vibration assures uniform operating speeds.

In making the changeover one of the cone pulleys was turned down and a V-pulley shrunk on, leaving proper clearance for V-belts. The brackets to mount the motor drives were welded together allowing proper belt centers. Drives were mounted over the cone pulleys which enabled safety guards to be easily installed. Examples of the various applications are shown in the accompanying illustrations.

All electric controls, including reversing switches, were mounted on the machines in the most convenient place for the operator, and on some of these drives the handle was lengthened to facilitate making speed adjustments. On the 36-in. x 18-ft. lathe, Fig. 1, a long shifter was attached to the handle to permit the operator to stop or start machine on long shafts without leaving his position. The milling machine shown in Fig. 5 had a solid yoke, so a cog V-belt could not be applied. Therefore, on this machine a chain link belt was employed, and it proved very satisfactory.

The boring machine pictured in Fig. 7 is used for winding large flat coils and is stopped and started very often. The old application was spread over a large floor space, as there was no room for an overhead line and countershafting. With the new drive and V-belt construction, floor space was saved and the handling of the machine made easier for operator. The radial drill, Fig. 6, previously had a 3-in. flat belt; when drilling large holes it always gave trouble, as the belts had to be very tight to prevent slippage. With the variable speed gearmotor and V-belt drive, it is almost impossible to stall the machine.

Since installation, maintenance has been negligible. The drives also helped the insurance rates, as all pulleys and gears could be readily guarded. The necessary ranges of speeds are all obtained with the multi-speed gearmotor, resulting in increased efficiency of the operating tools.

AT RIGHT

FIG. 3—Gearmotor drive speeds for this radial drill are 353, 515, 756 and 1160 r.p.m. The drive and driven pulley diameters are 4 in. and 14⅛ in., respectively. The distance between pulley centers is 24 in., and the drive is through four cog belts.

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CENTER

FIG. 4—The modernized drive for this 42-in. horizontal boring machine consists of a 5-hp. multi-speed gearmotor with output speeds of 354, 522, 783 and 1160 r.p.m. Pulley diameters are 3½ and 17¾ in., respectively, and the distance between pulley centers is 33 in. Six cog belts are employed.

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BELOW

FIG. 5—A 2-hp. gearmotor gives a four-speed range of 521 to 1750 r.p.m. for this 16 in. by 8 ft. engine lathe. Pulley diameters are 3½ and 11½ in. respectively and the distance between pulley centers is 27 in. Three cog belts are employed.

Press Innovations at Grand Rapids Stamping Plant

WHEN Fisher Body completed its Grand Rapids Stamping Division last fall, it had available what is undoubtedly the most modern press shop in the country, representing the last word in modern building construction, equipment and layout. Over $7,000,000 went into the project and of this amount better than $2,000,000 was invested in new press equipment. Some general views of the plant were presented on page 54 of the March 4, 1937, issue of THE IRON AGE, illustrating one of the presses, die shop equipment, welding apparatus and material handling facilities. This present article concerns itself with a detailed description of some of the heaviest presses installed, which incorporate novel design principles and which represent the first installation of their kind both as to style and capacity.

The largest of the presses are triple-action units which weigh more than 500 tons apiece, measure approximately 40 ft. from top to bottom and accommodate dies 180 in. long by 100 in. wide. These units are in service on the larger stampings for current body models, heavy ribbed floor pans and the Fisher "Turret" tops. Fig 1 shows one of these presses performing the initial draw on such a top.

These triple-action presses incorporate a new design feature which has proved advantageous in many ways. Instead of the driving mechanism (clutch, brake, gearing, flywheel, motor, etc.) being mounted on the top of the press, it is located below the factory floor. Here the driving mechanism is much more easily installed, is readily accessible from the pit floor for adjustment, inspection and maintenance without the usual hazards to both operators and maintenance crew when such work is carried on far above the operating floor.

A second important advantage of transferring drive to the pit is that it permits perfect symmetry in the press above the floor level. There are no projecting elements or overhanging parts to complicate space restrictions.

Transferring so much of the weight to the lower portion of the press locates the center of gravity of the entire unit considerably below that of a press of conventional design. In fact, it is below the die and below the operating floor level in these units. The combination of symmetrical design above floor level and lowering the center of gravity has practically eliminated vibration, resulting in a marked improvement in quality of the stampings. When observing this press at work for the first time, the relative absence of noise is apparent.

The triple-action press, as its name signifies, has three die slides, two above and one below. The two upper slides are toggle-actuated in order to provide dwell periods at the bottom of their strokes. The lower slide is crank actuated and does not dwell. The three slides are tied together, that is, they are driven from the one common clutch; they cannot get out of time with relation to each other.

When the blank has been placed upon the die, the clutch is engaged which puts the three slides into motion. The upper outer slide, or blankholder, has the more rapid downward travel. It contacts the blank first, at the bottom of its strike and then dwells to "hold" the blank during the drawing operations.

The upper inner slide, or plunger, which is descending at a lesser speed, performs the initial drawing operation and upon arriving at bottom stroke it also dwells and serves as a blankholder while the lower slide makes the second draw in the reverse direction. Then, all three slides return to their starting positions to complete the cycle, and the finished stamping is removed from the die.

The bottom slide, the lower portion of which is visible in Fig. 2, is reciprocated by four cranks driven from the two bull gears, one at either side of the press.

Mounted with each bull gear is an eccentric which is connected to a crosshead just above it. The latter reciprocates a long connecting rod (see Fig. 1) which extends vertically along the side of the press to the arch mechanism. Here a system of links and bell cranks operates the rock shafts. The outer slide rock shafts are actuated by the connecting rod at one side of the press, while those for the inner slide are actuated by the corresponding connecting rod at the other side of the press. The hookup being at the central portion of each rock shaft makes the drive perfectly symmetrical.

All slides are pneumatically counterbalanced, the outer slide, by four cylinders, one at each corner,

the inner slide, by two cylinders mounted in the slide itself, and the lower slide by a centrally located single cylinder.

All these presses are equipped for automatic pressure lubrication. Tubing from a central reservoir is carried to each bearing and supplies it periodically with a measured quantity of lubricant. Lubrication is effected irrespective of press operation, thus eliminating entirely the personal hazard of manual lubrication while the press is in operation.

The drive in these presses incorporates V-belts from a 100-hp. high-torque motor, a multiple-disc friction clutch and brake, which are air actuated and electrically controlled by push buttons at each operator's stations, of which there are four. Fig. 3 shows the drive side in the pit. In order to start the press for short, long or continuous action each member of the operating crew must press two starting buttons—one with each hand. Thus both hands of each member of the crew are safely engaged and out of danger when the slides descend.

Another innovation in the Fisher Body plant is the arrangement and location of presses. Presses, like other production equipment, must for maximum effectiveness be placed so that operations occur in regular sequence. The blank and subsequent stamping should move successively from one press to another with the least amount of handling and by the shortest route. Such a limitation presents no serious problem except for products such as automobile bodies subject to yearly model changes. Presses mounted on permanent concrete foundations cannot be moved about each time a change in model makes it desirable.

The necessary flexibility in press disposition has been found in the continuous pit over which all units in the Fisher Body press line are carried. With this arrangement it is comparatively simple to shift the relative position of presses in the line to accommodate new manufacturing requirements because each unit is carried on movable girders which can be placed at any point along a pair of girder rails extending the full length of the pits, of which there are 10. The construction was described in detail in an article appearing in the Sept. 10, 1936, issue of THE IRON AGE, page 40. Over 2000 tons of steel went into the press foundations alone.

There are three presses of this design which measure 180 in. be-

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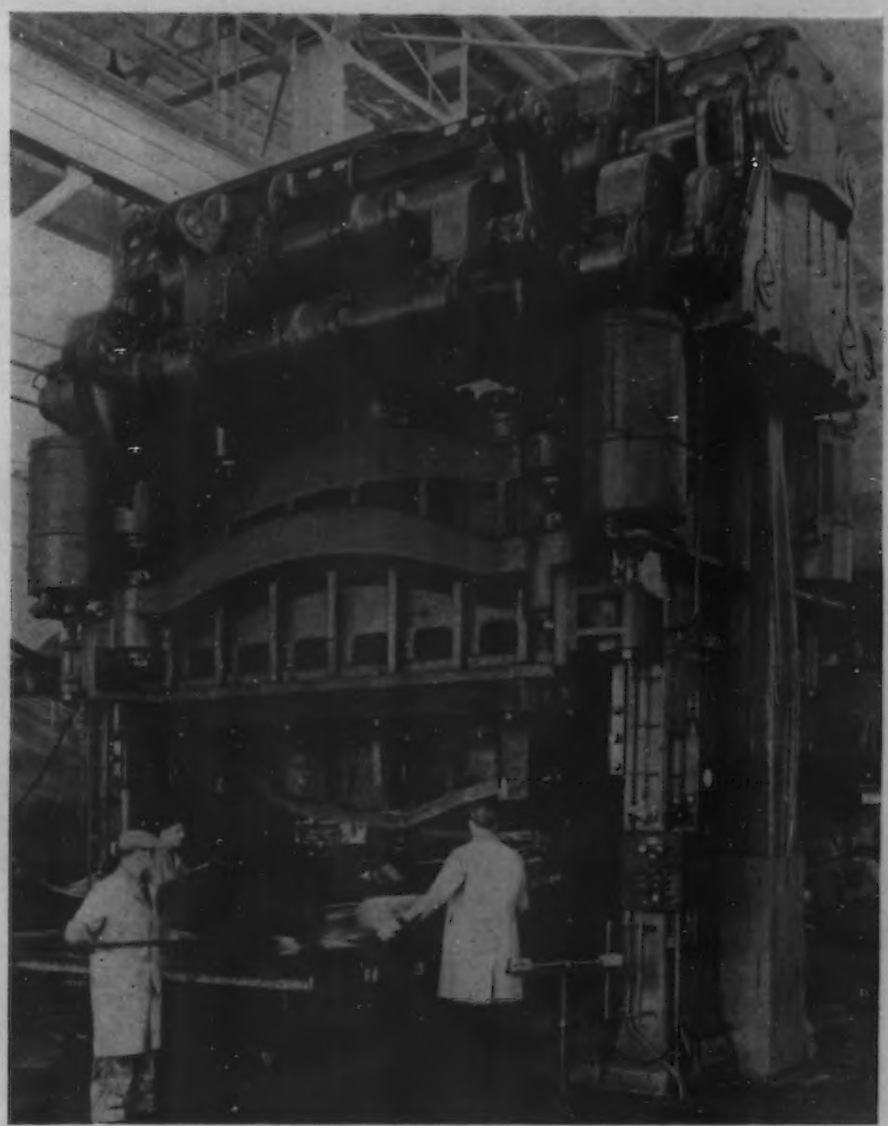

FIG. 1—This huge triple-action press of 1000-ton capacity accommodates dies 180 in. long. Driving mechanism is in the base well under the floor line, bringing the center of gravity below the floor line. Drive of the upper slides is by side connecting rods actuated by eccentrics. Weight approximately 500 tons.

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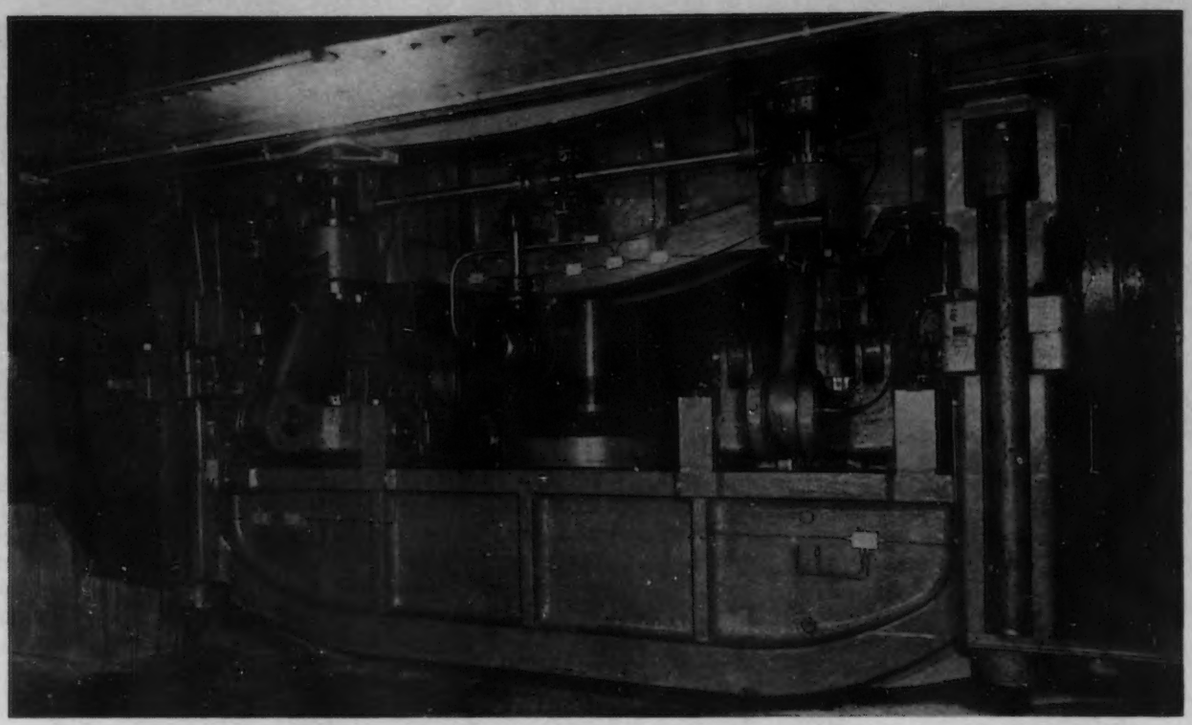


FIG. 2—Front side of the press shown in Fig. 1, but below the floor line, showing the lower slide which is actuated by four cranks.

tween the uprights, and seven smaller ones. There are also a number of triple-acting presses of conventional design transferred from other Fisher Body units.

Most of the new presses in this plant are precision-preloaded to lessen the danger of disastrous overloads which often occur approximately at bottom stroke and which are due to variation in blank thickness, improper die setting, double blanks and other accidental obstructions. In a highly rigid press, overloads of this character are one of the chief causes for expensive press failures. Precision preloading consists of stressing all tie rods simultaneously and equally by hydraulic pressure to a predetermined amount equal to the maximum press capacity. When the load is greater than this predetermined maximum the tie rods

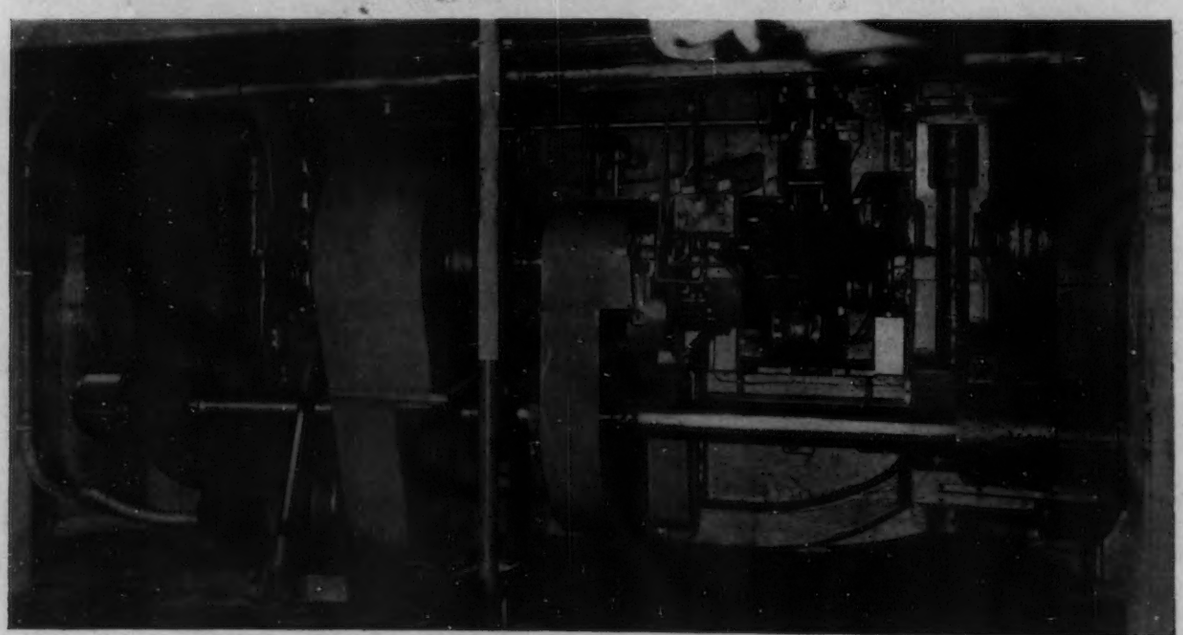


FIG. 3—Drive side of the 1000-ton triple-action press. Clutch and brake are air actuated with electrical controls. Drive from the pivoted 100-hp. motor is by V-belt to the flywheel.

behave as springs and elongate to allow the slide to pass through its bottom position without developing critical stresses in any of the press elements. The presence of any movement in an upright is an indication to the operator of an excessive overload condition. When such a condition is realized, the reason for it can be immediately located and the difficulty corrected before serious damage is done.

Typical of the work produced in the Grand Rapids plant is the Fisher Turret Top. The material is 20-gage cold-rolled body stock which comes in blanks 68 x 112 in. in size. After being roller-leveled to restore its drawing qualities, the sheet is drawn to shape in one of the 180 in. triple-acting presses just described. The top is drawn in an inverted position and must be reversed for the next operation. A sponge rubber pad on the withdrawing side of the die prevents scratching of the highly finished sheet. The die set weighs about 35 tons. Maximum depth of draw is 16 in. Using a crew of six men, including the operator, four helpers and an oiler, production is 175 tops an hour.

From the back side of the press the formed top is slid along rails to a single-acting press in which the top is trimmed all around and the window opening blanked. This single-acting press has a 4-point slide with the connections outside the edges of the platen so as to prevent "tilting" regardless of where the pressure load is centered. To assure proper registration of upper and lower die members there are large size guide pins at each corner and in addition the dies are heeled three ways at each end.

One press operation remains, and it is carried out in one of the new 180 in. triple-acting presses, and while it is not a drawing operation it requires the use of all three slides. In this set-up the top is restruck to shape, the sides are flanged and the trunk opening is flanged, accompliished by a series of wedge dies.

The stamping of this rear quarter panel requires a line of seven presses, all single-acting, except the first, which is a triple-acting type for the drawing operation. Most of the single-acting presses carry wedge dies of one sort or another. Heavily ribbed floor pans are processed much in the same way, but fewer operations and hence fewer presses are required. The initial draw is made in a 180 in. triple-acting press, and the following three operations are performed in a 180 in. 4-point single-acting press with three dies on the bolster plate.

The Grand Rapids Stamping Division carries the stampings only through sub-assembly operations, including spot and gun welding of small attachments. These sub-assemblies are shipped in stacked form to the various body assembly plants of Fisher Body where they are fabricated into finished body shells.

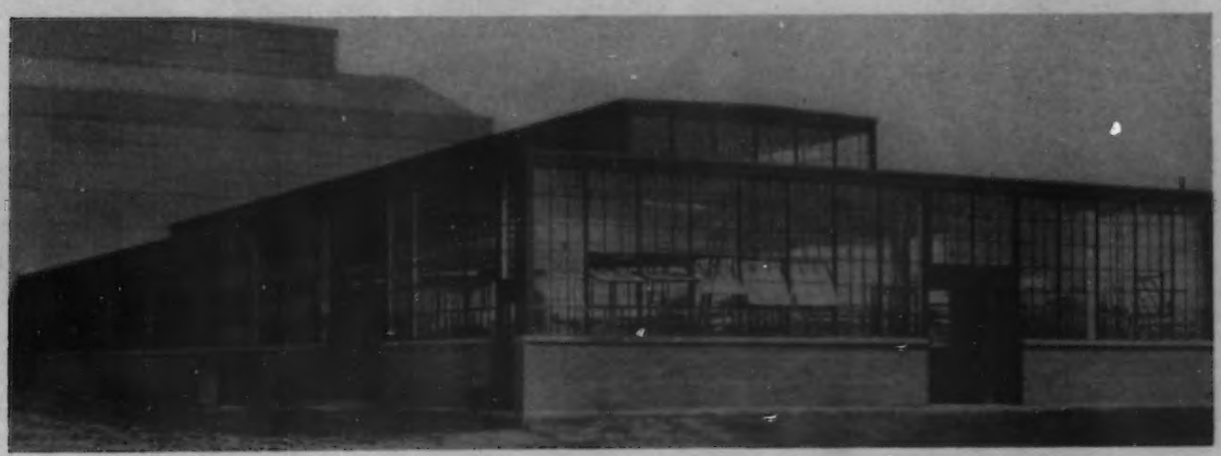
Pontiac Equips Shop for Training School

IN a new building equipped with more than $150,000 worth of machine tools and incidentals, Pontiac Motor Division of General Motors is launching an extensive apprentice training program designed to eliminate the shortage of skilled men for highly specialized phases of the automobile industry, according to H. J. Klinger, general manager. The school building is already erected and being equipped. It is a structure of steel, brick and glass with 10,044 sq. ft. of floor space adjacent to the frame storage plant at Pontiac, Mich.

Included in the training equipment are drill presses, bench lathes, seven grinders, screw machines, ten milling machines, including a boring mill and vertical shaper, 10 lathes, complete pattern shop and heat treat installation.

Tentative plans call for the gradual admission of new students until the quota of 50 has been reached. Thereafter new students will be admitted only as old ones complete their training, thus assuring a continuous supply of trained men throughout the year and avoiding temporary oversupply which would result from having annual graduation of classes.

The new building is part of an expansion which includes also a foundry addition, mainly for core storage, and a new adminstration building. The foundry addition will connect two present foundry units. It will be 230 ft. long by 88 ft. wide and 34 ft. high.



Gas Immersion Heating

Hot Solution Tanks, Cleaning Tanks, etc., Heated by a New, Simple, and Economical Method

By J. B. NEALEY
American Gas Association

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HOT solution tanks are universally employed throughout industry, particularly for product cleaning; for few products will take a finish unless the dirt, grease, and foreign matter acquired in manufacture is first removed. Practically every metal product factory is equipped with one or more hot solution cleaning tanks. While most of these are used for dipping, many are part of the automatic cleaning and drying machines equipped with traveling conveyors, as shown in Fig. 1. These machines are so designed as to speeds and capacities that they become machine tools and are synchronized with other machines in the production line. In any case the speed and flexibility of heating is most important.

Gas immersion is the modern, economical way of heating hot solution tanks. It is new, ingenious, simple and efficient. Formerly steam or underfiring with gas was employed, while some used more expensive energy. Gas immersion heating for the tanks is cheaper and faster to operate and more economical to install. It is a decided improvement over gas underfiring, the next best method, and formerly the most popular. In the first place, sediment deposition materially reduces heat transfer and subsequent overheating will cause the tank bottom to break down rapidly. The immersion tubes or coils are spaced above the bottom so as not to be affected by this factor. Secondly, the bottom, as well as the sides, can be insulated. This cuts heat losses and fuel consumption and makes the operation more comfortable for the operator.

Compared with steam heat from a central power plant or heating system, high overall efficiencies are obtained with gas immersion, and equipment costs are very low. Flexibility is obtained with a battery of gas immersion units, as the number in use can be quickly increased or decreased to meet fluctuating production schedules. Wooden tanks can be heated with gas immersion coils but not by underfiring. Common iron and steel pipes are satisfactory with ordinary cleaning solutions. Lead coils are used with acid tanks (pickling, electroplating, etc.).

Immersion coils are made up of lengths of standard pipe with standard fittings. They are laid horizontally and close to the bottom of the tank with one end welded to a hole in one side of the tank. A gas burner is clamped to the outside of the tank in such a position as to fire through this hole and into the coil. To the other end of the coil is attached an upright piece of pipe to act as a flue. Either atmospheric or pressure gas burners can be used. Any existing installation can be quickly and easily converted to this method of heating. However, stock sizes of liquid heating tanks equipped with immersion gas heating tubes are available from a number of manufacturers. When cutting holes in the tank is inadvisable, a U tube

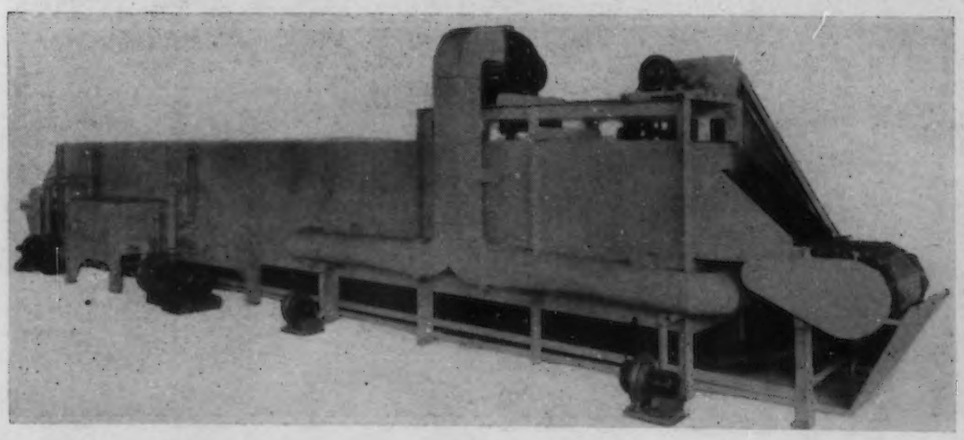

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FIG. 1—Continuous, automatic unit for washing, rinsing and drying. Immersion gas burners heat the solution in the tank. The drying ovens are gas fired. In this installation the hot cleaning compounds and rinsing solutions are forced under pressure through nozzles against the work.

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can be used with the burner firing down one leg. A design which has proved successful in actual service is shown in Fig. 2. The tanks, for the most part, are 3x3x3 ft. Pipe sizes range well within 3 to 5 in. in diameter. Flue heights vary from 4 to 7 ft. The longer flues provide greater draft and the burning of larger volumes of gas which results in faster heating. There is considerable latitude as to design and heat input, all resulting in equal efficiencies. While an increase in the heating speed is at the sacrifice of efficiency, when operating at holding heat, this efficiency can be restored by turning down the burner.

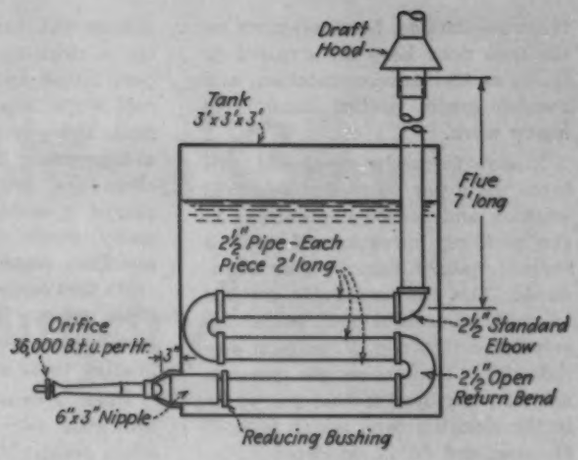


FIG. 2—Construction details of a typical installation using atmospheric type gas burner with coil in a vertical plane. Applications involving corrosive acids require lead pipes.

Insulation Increases Economies

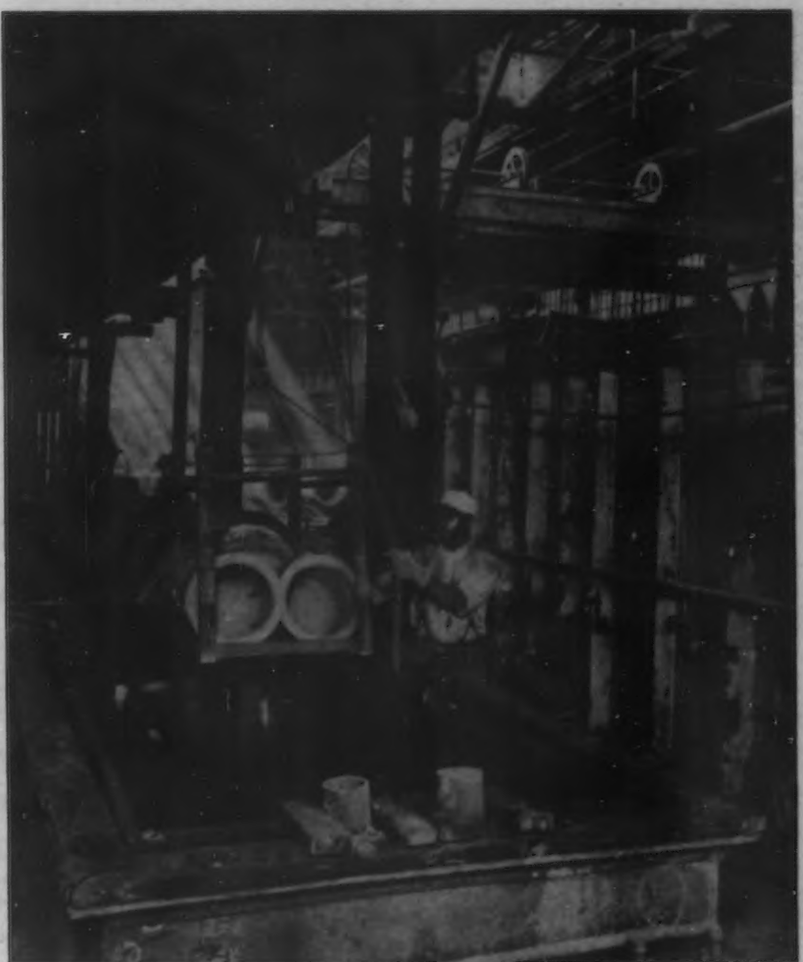
Insulation is desirable but not necessary. Uninsulated tanks operate at 150 deg. F. lose about 180 B.t.u. of heat per hr. per sq. ft. of wall surface by radiation and convection. The heat loss from the surface of the liquid is at about the same rate, to which must be added the evaporation loss. Tank wall losses can be reduced about 90 per cent with 3 in. of insulation during the holding periods. The corresponding reduction in gas consumption would amount to approximately 35 per cent. Further economies can be obtained by using temperature controls and safety pilots.

When the cleaning process is mechanized, two or more tanks are usually incorporated. A hood covers the entire installation and pumps force the liquids through jets or spray nozzles, against the work as it passes on the conveyor. The liquids run back into the tanks for reheating and reuse. The first tank contains the cleaning solution and the second a rinse. To this setup is attached an enclosed sheet metal extension, with open gas flame burners, which acts as a drying oven. Waste heat from the flues can be utilized to good effect here. Occasionally increased speed is effected by shortening the oven and applying gas-air torches manually to finish the drying of the work at the seams.

Immersion tube heating can be applied to pickling and plating tanks, either metal or wood, containing acid, by using lead tubes. Ordinary lead waste pipe with walls ⅛ in. thick and heavier, have proved satisfactory. Very economical installations can be made in the case of 500 and 1000-gal. tanks and by using reasonably priced automatic temperature controls with motorized valves, liquid temperature thermostats, safety pilots and gas pressure controls, the installation can be made entirely automatic.

One pickling installation the writer recently saw consisted of a lead lined wooden tank 5x12x3 ft. deep, as shown in Fig. 3. Heating is accomplished with four gas burners firing into immersion coils of lead pipe 4 in. in diameter. These lead pipes extend the entire length of the tank where they are connected with vertical sections forming stacks. The other ends of the pipes extend through the tank wall and gas burners fire into them

FIG. 3—Immersion heating of pickle tank, with gas burners firing into lead coils submerged in the acid. Lead lined wood tanks are employed.



from the outside. Lead supports on the tank floor keep them raised ¾ in. so as to insure circulation, and wooden grates protect them from heavy work.

Steam formerly employed, diluted the 6 per cent sulphuric acid solution and caused fluctuations in the pickling operation of such a serious nature that it was abandoned. The gas immersion method is most successful and keeps the solution at 180 deg. F. without any difficulty. Immersion gas burners are also employed to heat the water in the cleaning tank which is 5x45 ft. long and 30 in. in depth.

Degreaser and High Pressure Gas

The degreaser is a comparatively new development in cleaning. It utilizes the heated tank to vaporize a cleaning solution. The vapors rising and condensing on the cold work, dissolve the grease and flush the parts free of both dirt and grease. The work comes out clean and dry. The solvent employed is stable and is said to be many times more effective than gasoline, naphtha and other solvents that cannot be heated or boiled with safety. Here again the gas immersion coil is the ideal way of heating these degreasers.

High pressure gas burners are indicated for large installations, when greater speed and better control over combustion are desired. Any one of the conventional gas burner designs—pre-mixing, proportional inspiration, or high pressure gas—can be used with equal advantage. Much greater gas burning capacities in tubes of given size are possible with burners in this class. Heat transfer rates as high as 15,000 B.t.u. per sq. ft. of coil area have been reported, and as newer types of gas firing equipment become available, even greater rates are anticipated. In the case of locations where explosive gases are present, gas burners are available which are totally enclosed. Pressure gas burners and immersion tubes are also employed to melt heavy materials, as salts for salt baths for heat treating, asphalt, wax, and the softer metals used in bearings, die castings, lead baths, electrotype pots, etc.

Welding Society Publishes Standard Symbols

REALIZING that welding cannot take its place as an engineering tool unless means are provided for conveying full information from designer to workmen, the American Welding Society has evolved and published a set of standard welding symbols covering both fusion and resistance welding.

These symbols, shown in Figs. 1 and 2, provide the means of placing complete welding information on drawings. They are ideographic; that is, they are picture-writing symbols, showing graphically the type of weld required. In evolving the symbols, the need for simplicity has been kept in mind and the general principle has been followed of having the most common form of any weld require a minimum of numerical data. In final form, the scheme amounts to a shorthand system whereby a large amount of information may be conveyed accurately with a few simple lines and numbers.

It is pointed out that, in practice, many companies may require only a few of the symbols, and if they desire, can make up their own legends, selecting such parts of the system as fit their needs, and discarding the remainder. In such a case, where a weld departs from the user's standard, supplementary data will become necessary. But, this simply makes the user's standard a part of the symbol system and means only that exact interpretation will vary slightly among different users. On the whole the symbols lay the foundation for a much needed universal welding language.

Complete information may be had from the American Welding Society, 33 West 39th Street, New York.

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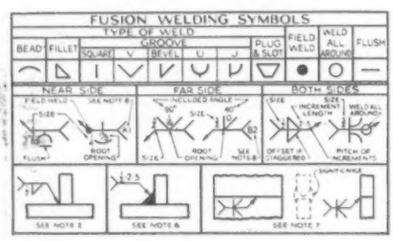
BOTH fusion and resistance welding are covered by the new A.W.S. standard symbols. A page from the booklet is shown at the right.

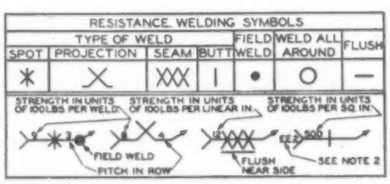
1937 WELDING SYMBOLS



1. In plan or elevation, near, far and both sides locations refer to nearest member parallel to plane of drawing and not to others farther behind.
2. In section or end views only, when weld is not drawn the side to which arrow points is considered near side.
3. Welds on both sides are of same size unless otherwise shown.
4. Symbols govern to break in continuity of structure or to extent of hatching or dimension lines.
5. All welds are continuous and of user's standard proportions and all except V- and bevel-grooved welds are closed unless otherwise shown.
6. When welds are drawn in section or end views, obvious information is not given by symbol.
7. In joints in which one member only is to be grooved arrows point to that member.
8. Tail of arrow used for specification reference.

Note: All dimensions are in inches.

Fig. 1—Legend for Use on Drawings Specifying Fusion Welding



1. Symbols govern to break in continuity of structure or to extent of dimension lines.
2. Tail of arrow used for specification reference.

Note: All dimensions are in inches.

Fig. 2—Legend for Use on Drawings Specifying Resistance Welding

Cost Control in a Gray Iron Foundry*

THE various methods of allocation, on the basis of direct wages, time, space and tonnage, were considered and compared at length at several meetings and discussed by correspondence. It has been found that the simplest and soundest method applying to the average size foundry is that based on direct labor. This method is open to some criticism in certain cases, but so are all the other methods. The tonnage basis has been ruled out as definitely unsound; the space and space-time methods have been found too complicated and open to objections.

In certain cases the time method would be acceptable, but it has been found that for the majority of cases, and in view of the fact that in any case wages must be accurately recorded, the "direct labor" method is the best to adopt for a uniform system, and the one least likely to offer the risk of inaccuracies and complications. It has, therefore, been recommended that overhead charges in the molding department be computed on the basis of "direct labor."

IN this, the second and last section of a paper dealing with the important subject of cost control in a gray iron foundry, attention is centered on overheads in the melting department, cost items in the core department, pattern shop and cleaning and fettling departments. Last week, the importance and general operation of cost control systems were described, and specific attention was directed toward the various direct and indirect charges which must be considered, the cost of metal and of melting, and how these costs can be kept under control.

Where a fair number of apprentices are employed, it is recommended that the percentage of overheads applied to apprentice wages should be increased in relation to the difference between ordinary molders' wages and apprentices' wages, taking into account the relative numbers of men employed in each category. A formula** is available which gives the correct percentage applying to each category, but if the result be obtained by approximation, care should be taken and a check made to insure that the full amount of overheads has been accounted for.

Recommendations cannot be offered applying to widely exceptional cases, except that the fundamental principles of this system should be applied, but that their detailed application should be adapted to the circumstances of the case and governed by common sense.

Note: Knocking-out costs must not be overlooked; their treatment depends upon the organization of the foundry. In most cases the knocking-out station is in the molding department; in other cases in the fettling department. It may be treated as a direct or an indirect cost. In any given case, the principles of the system must be applied to that particular case.

Application of the System

The following is a list of certain current items of cost that make up the overhead expenses relating to the molding department. This list is not exhaustive and should be modified in accordance with the circumstances of each undertaking; it is given merely as a guide. Certain headings, such as box parts, foundry tackle, materials *ex* stores, are included to cover those items that could not be charged as "direct costs" against a particular job.

Labor, unproductive: Wages.
Labor, unproductive: Salaries.
Labor, unproductive: Stores.
Labor, unproductive: Packers.
Box parts: Labor.
Box parts: Materials.
Foundry tackle: Labor.
Foundry tackle: Materials.
Sand: Labor.
Sand: Materials.
(or cost of sand preparation auxiliary department.)
Drying stoves, labor and materials.
Materials *ex* stores.
Coal dust.
Molding machines, repairs, labor and materials.

* Paper presented to the Thirty-Fourth Annual Conference of the Institute of British Foundrymen, held at Derby, June 8-11. The first part appeared in these columns last week.

** The formula is as follows, x being the percentage applying to the experienced molder's wage, and y the percentage applying to the apprentice's wage:

$$x \text{ per cent} = 100\,\frac{O}{M + pA}$$

$$y \text{ per cent} = px \text{ per cent}$$

Where O is the amount of overheads to be allocated during a given period.
M is the total amount of wages paid to the experienced molder during the period.
A is the total amount of wages paid to the apprentice during the period.
p is the amount by which the unit wage of the apprentice is smaller than the unit wage of the experienced molder, i.e., if apprentice wage is one-half the molder's wage, or twice as small, $p = 2$; if one-third, or three times as small, $p = 3$.

Plant repairs, labor and materials.
Salaries.
Coal and gas.
Power, light and heat.
Handling of materials, castings, etc.
Workmen's compensation insurance.
Social security tax.
Laboratory wages and salaries.
Laboratory materials.
Rent and rates.
Depreciation of boxes.
Depreciation of fixed and movable plant, etc.

Those items that can be allocated to a particular section of the foundry should be extracted from this list and allocated to the proper section; for instance, the cost relative to drying stoves, including fuel, should be charged to the dry sand mold section; repair and depreciation of molding machines should be charged to the machine molding section; tools used for loam molding should be charged to the loam molding section, etc.

All the other items that apply to all sections of the foundry are then totaled; the ratio of the total amount relating to these items to direct labor costs in the molding department is taken. In each section of the foundry, the ratio of overheads specifically charged to that section to direct labor costs in that section is also taken.

For instance, if total direct wages in the molding department during a costing period amount to $1000, and all items of indirect cost applying to all sections of the foundry total $800, the percentage to apply to direct labor costs to cover these items is 80 per cent, or for each $5 of direct labor $4 should be added. If direct wages in the dry mold section amount to $600 and the overhead applying specifically to the section amounts to $150, 25 per cent of direct labor costs should be added further for that section, or $1.25 for every $5. In the same way, the molding machine overhead might be 15 per cent of direct labor costs for that section.

Applying this to a job made from mixture A, yielding 67½ per cent of good castings, made with dry sand molds on a molding machine, the overhead applying to all sections of the foundry will be 80 per cent of direct wages charged to the job, plus 15 per cent for the molding machines, plus 25 per cent for the drying stoves; therefore, the percentage overhead for this job will be 120 per cent of direct wages. This gives:

Cost of metal at the spout, per ton of good castings (obtained from melting department, Mixture "A," Class II)	$21.00
Direct labor	13.75 (L)
Overhead—	
120 per cent of L.	16.50
Patterns, cores, boxes, etc.	3.75
Total cost	$55.00

This gives the cost per ton of good castings of the job up to the point where it leaves the molding shop.

Core Department

The core department is just as much a productive department as the molding department—therefore, core costs must not be considered as an overhead charge against the molding department, but must be calculated in the same way as molding costs. Furthermore, cores must be identified with the job for which they are made and their cost charged accordingly to the respective jobs.

Wages must be carefully recorded, a separate record being kept of direct wages paid to the coremakers, as this will be the basis for the allocation of overheads. For this purpose also, core jobs should be classified on the cost sheets, as between green sand cores and dried sand cores, hand made and machine made cores.

As far as is possible, efforts should be made to treat the cost of the sand, core oils, binders, etc., constituting the core mixture in a direct manner. The unit cost of any particular core mixture can be ascertained quite simply. The weight of mixture required for any particular core is also easily ascertained. In this way the cost of a mixture for particular cores can be arrived at.

Like molding boxes, core boxes and jigs made specially for one job should be charged to that job. Other equipment for running production should be debited to a special account and liberally depreciated, this depreciation being charged as a departmental overhead against the core department. Core irons, wires, grids, etc., should not be overlooked. In large engineering jobs they may rise to a considerable amount. In any case, they should be properly issued from stores and properly accounted for.

Departmental overheads include, in addition to the items already mentioned in the section relating to the molding department, maintenance and depreciation on such items as the core-drying ovens, core machines, etc. Core wastage in general should be charged in the core shop, and the resulting cost of good cores is charged to their respective jobs in the foundry. As in the molding department, the overheads of the core shop should be allocated to the various jobs on the "direct labor" basis.

Pattern Shop

This is considered as an auxiliary department. In accordance with the fundamental principle of the system, patterns made for a specific job should be charged to that job; if made for a special client, the cost should be charged to the client. As in other departments, the expense of the pattern shop includes (*a*) direct costs—*i.e.*, direct wages and material; (*b*) indirect costs—*i.e.*, indirect materials, such as screws, varnish, paint, and (*c*) overhead expense which cannot be charged direct.

As regards direct costs, these are charged direct to the patterns made for special jobs, and to running patterns respectively. Any indirect costs that can reasonably be charged to specific jobs should be so charged. All other overheads are calculated as a percentage of "direct labor," so that specific jobs should bear their proper share of such overheads. Then all new running patterns are capitalized, and their depreciation, together with maintenance, repairs, and overheads not already charged to specific jobs are charged as an oncost of the molding department.

Cleaning and Fettling

This department covers all operations effected on castings from the time when they are knocked out of the mold until they are cleaned and dressed. Any other special treatment of the surface of a casting—as, for instance, enameling or other finishing operations—is not included in the cleaning and dressing department and is outside the scope of the present system.

It is recommended that the cleaning and fettling department should be divided into two main sections: (*a*) A section where labor is the main item of cost and where one casting is dealt with at a time, such as is the case for chipping, grinding, filing, wire brushing, etc.; (*b*)

a section covering operations in respect of which the principal item of cost is power and depreciation of plant, and where a number of castings are treated together, such as is the case for tumbling, sandblasting, pickling.

With regard to section (*a*), labor is a direct cost applying to each job, and all departmental overheads, including the cost of files, chisels, brushes, hammers, emery wheels, etc., are to be allocated on a direct wage percentage basis. In quite a number of foundries where plant is not used, this system will apply quite simply.

As regards section (*b*), a simple system consists of adding up all costs, including power, labor, depreciation of plant, abrasives, shot, and departmental overheads less any portion charged to section (*a*), and allocating the total cost to each job on a weight basis.

For the larger foundries where various types of plant are used, such as tumbling barrels and sandblasting plant, a more precise system is recommended. It will be realized that weight is not the only factor that intervenes in these types of plant; the time necessary to clean various kinds of castings is another variable factor, which depends more upon the shape and degree of intricacy of the casting than upon its weight.

In tumbling barrels, all the castings are put in and taken out at the same time, and if there is only one barrel, its cost cannot be allocated otherwise than on a weight basis, but if a foundry uses more than one tumbler, it should be possible, as a result of experience, to allocate the barrels to classes of castings, putting together those castings that take the same time to clean. The direct cost of operation of each barrel can be arrived at, and for each one that cost is charged to the castings on a weight basis; the overheads of the tumbling section should be added, also on a weight basis.

In sandblasting, in those cases where the castings can be taken out when they are cleaned without disturbing the other castings for which the operation is not completed, the castings can be classified or tabulated in accordance with the time taken to sandblast them. Experience will tell to which class a particular casting should belong. Taking into account the total tonnage passed during a given period, the cost of operating the sandblasting section, including overheads, can then be charged to the castings on a ton-hour basis.

Castings inspection charges: When special inspection is effected for a specific job, the cost should be charged to the job. In other cases inspection costs should be charged as an oncost on the departments concerned.

Other auxiliary departments: In undertakings that operate their own light, heat and power plant, this should be considered as an auxiliary department, and the cost per unit should be worked out, taking into account all overheads applying to that department. The cost of heat, light and power thus being known, it can be applied to the various departments of the undertaking, as explained in the costing system.

If there is a separate maintenance and repairs department, whenever possible individual costs should be worked out and charged to the appropriate place. For general maintenance and repair work, the cost is an overhead on the appropriate department.

Packing and dispatching: These items should be regarded as an overhead, and calculated as a percentage of productive labor in the molding department.

Freight: This is an item the cost of which is usually determined for particular jobs, and it can be added at the end of the cost sheet.

General Overheads

There are a number of items, additional to actual production costs, such as directors' fees, workmen's mess rooms and clubs, financial charges, etc., which cannot easily be allocated to any particular department. There is also the question of selling costs and publicity.

At the stage now reached it can be stated that all actual manufacturing costs have been considered, and if such costs are calculated by means of a system that is uniform for the industry, there is available a basis upon which such manufacturing costs can properly and fairly be ascertained and recorded.

As for the items of expenditure referred to in this paragraph as "general overheads," it is suggested that they should be considered apart from, or in addition to, the actual manufacturing costs. The items now under review vary considerably from one undertaking to another. There are cases where directors are in charge of a department and receive a fixed salary, which then becomes a departmental oncost. Some undertakings may be in the fortunate position of having no financial charges. Some are not of sufficient size to finance and maintain workmen's clubs, etc. Publicity and selling costs vary widely. These items, by their very nature, may tend to distort the truly comparable value of actual manufacturing costs arrived at so far.

It is, therefore, suggested that the basic production cost figure is that arrived at at the despatch stage, and before freight is added. Then, to complete the costing process of any given undertaking, the general overheads must be added to the manufacturing cost figure, and allocated as a percentage of productive labor on direct molding and core shop wages.

The recommendations set out in this report are postulated in the hope that, subject to any adjustments and additions that may subsequently arise, they will be accepted as guiding principles by the industry at large, which will then be provided with a proved and comparable costing system.

Survey of Pittsburgh Housing

COMPREHENSIVE data on housing conditions in Pittsburgh and Allegheny County are presented in a series of charts and maps released by the Bureau of Business Research, University of Pittsburgh. The charts and maps constitute the major portion of a 60-page pamphlet published under the title "Graphic Summary of Housing Conditions in Allegheny County." This pamphlet was prepared from data collected by the Bureau. One series of charts compares housing conditions in Pittsburgh and Allegheny County with those in some 36 other metropolitan areas. The ranking of Pittsburgh and the county among these metropolitan areas with respect to various housing standards is definitely indicated.

New Partool Plant Is In Operation

LAYOUT of the new Partool Machine Co.'s shop in Detroit together with its right-spindle horizontal rotary lathe for turning flanged bodies used in automobile drive universal joints.

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ONE of the newest and most modern of the machine tool plants supplying the automotive industry in Detroit is that of the Partool Machine Co., 9111 Schaefer Highway. In an ultra-modern $50,000 building occupied last February, the concern is now operating in full stride, having just delivered a special eight-spindle horizontal rotary lathe for turning flanged bodies used in automobile drive universal joints. Besides specializing in the design and manufacture of such special equipment as this, Partool also handles rebuilding jobs for the automobile plants.

More than $80,000 worth of new equipment has been put into service, including a 10-ton Northern crane, 48-in. Cincinnati open side planer, 3½-ft. Cincinnati Bickford radial drill, 6-ft. American radial drill, 16 x 72-in. Cincinnati universal cylindrical grinder, Radiac cut-off machine, 4-in. Giddings & Lewis boring machine, 3-in. Universal boring machine, two Reed-Prentice 16-in. lathes, two Hendey lathes, three Smith & Mills shapers, Warner & Swasey hand screw machine, Reed Bros. surface grinders, Henry & Wright sensitive drills, Cincinnati drill press, Heald internal grinder, Brown & Sharpe cylindrical grinder, V & O press, Cincinnati milling machines and Swiss jig boring machine.

Charles E. French is president and Ora A. Montgomery is secretary-treasurer.

Apollo Metal Works, Clearing, Ill., manufacturer of nickel and chromium plated sheets, has brought out its product, "Protex," in a new form, said to be an improvement over the first product put on the market a few years ago. "Protex" is an adhesive paper, which is said to stick well to highly polished sheets during forming and bending operations, and then may be easily peeled off without leaving trace of the adhesive and its use prevents die scratching.

Introduces New Line of Spring Making Machines

THE new line of spring making machines recently announced by the Torrington Mfg. Co., Torrington, Conn., includes segment and clutch-type coilers in eight sizes, covering a range from 0.006 to ⅜-in. diameter wire, and a torsion spring winder in four sizes, covering a range from 0.0006 to ¼-in. wire.

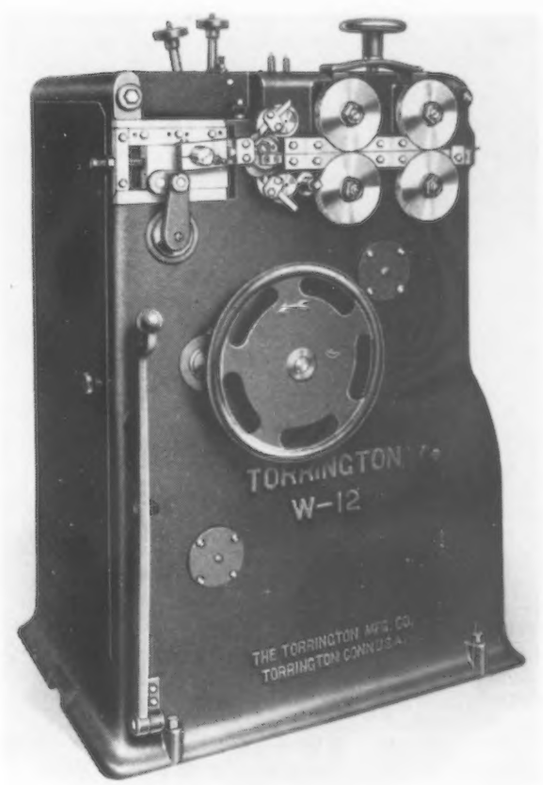
The machines are of rugged construction and have Timken bearing drive shafts, with adjustment. All controls are centralized at the operating position. A number of features facilitate production. On the segment and clutch-type machines the cutter-shafts may be quickly adjusted axially from the front of the machines. The cam compound levers are adjusted with the same type of arrangement and the diameter and pitch controls are easily manipulated by hand screw-knobs at the top of the machine. The arbor and tool holder are held rigidly by a strong toolpost. The diameter slide is connected to its control by a solid link.

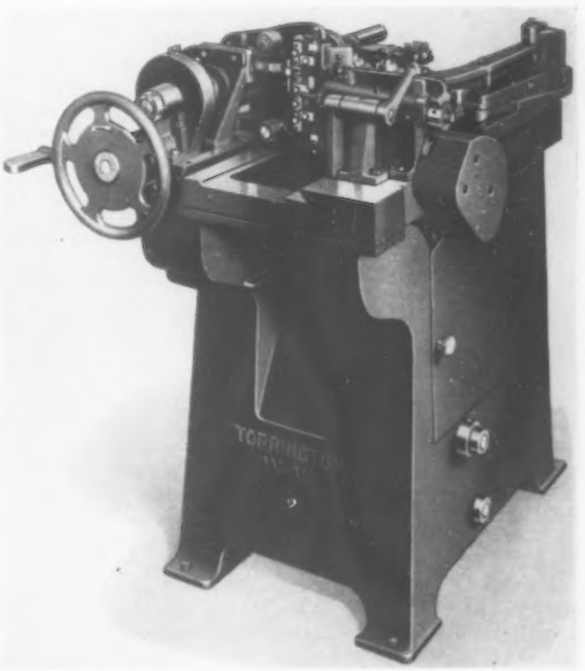
The segment-type machines incorporate a simple wire feed adjustment having a wedge-type locking gib operated by a single binding screw. A set of pick-off change gears on the rear of the machine permits increasing the amount of wire feed above the rated capacity. Through another set of gears, inclosed at the front, the operating speed may be adjusted to the job. The camshaft on both types of coilers is located near the front of the machine to facilitate cam adjustment.

On the clutch-type machines, positive clutch engagement and throw-out, in conjunction with an adjustable brake, provides accurate control over the amount of wire fed to each spring. Equipped with a long-spring attachment, any length of spring may be coiled. Change gears on this machine are of fixed-center type, but the smaller sizes of clutch-type machines may be equipped with a sliding gear box, with which the amount of wire fed can be changed merely by operating a shift control. Both the segment and clutch-type machines, with standard equipment, are designed to make all kinds of compression and extension springs.

The torsion spring winding machine is of unique design. The spindle drive is based on a combination of cam and compound levers, which gives control over the number of coils in a spring, and also allots time in the operating cycle for the forming operation. The wire feed mechanism is designed for accurate control of amount of wire fed into the projecting ends of the spring. The standard machine is equipped with cutter slides that will form projected ends in one plane, but it can be equipped with an attachment that will form ends in any plane.

The Interstate Commerce Commission has found justified Kentucky intrastate rates on iron and steel articles, scrap and coke. The finding was the result of an investigation instituted on petition of carriers operating in Kentucky to determine whether intrastate rates on iron and steel, scrap and other products, as required by orders of the Railroad Commission of Kentucky of Nov. 15, 1935, cause any undue advantage to or against interstate commerce.





TORRINGTON spring coilers, made in both clutch and segment types, incorporate centralized control and other features designed to facilitate spring production.

THE spindle drive arrangement of the torsion spring winder gives control of the number of coils in the spring and also allots time for the forming operation.

THIS WEEK ON THE ASSEMBLY LINE

. . . Higher automobile prices foreshadowed by $30 to $100 rises going into effect now; 5% increases believed too small to offset higher costs in manufacture.

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. . . Ford to produce 110,000 to 150,000 more of 1937 models in next month before changing to 1938 lines.

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. . . Dearborn officials calls UAW union "legal nonentity" in refusing sanction for police guard over pamphleteers.

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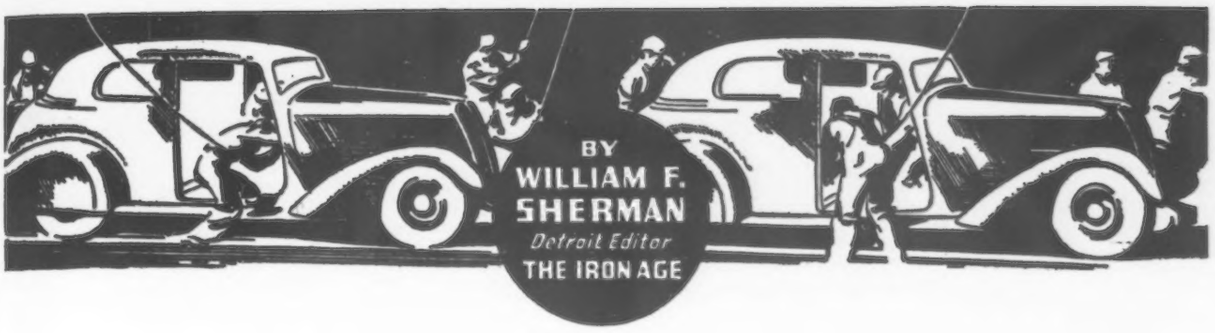
. . . Employment index and auto production slump sharply as seasonal shutdowns and labor trouble combine their effects in Detroit.

DETROIT, Aug. 9.—Probably to ease the shock of higher retail prices yet to come, the automobile industry is now putting through a boost in price schedules that ranges from $30 to $100 per car, the amount of the price increase being about 5 per cent in most cases. Because parts are costing about 15 per cent more than they did a year ago, and because labor costs are as much as 20 per cent higher in some cases, it is intimated that the present raises are not enough, so new models may cost even more when they are introduced a few months hence. The announcements of increases for this week came from General Motors divisions, but price boosting was initiated more than a week ago by Ford Motor Co., which added $15 to $35 per car to 1937 prices. Chrysler is expected to do the same.

It is possible, of course, that these increases may be the final word and that the industry may decide to accept smaller unit profits to avoid killing the market. Most people are hopeful that this can be done, particularly because of the medium-price buyer. In the last year the middle bracket of the price list has done much better in sales than the top or bottom. As a result of this trend to medium-priced cars since the upswing from the depression, many heretofore small producers have gone into the volume class. Packard is an outstanding example. This year's July deliveries were 113 per cent ahead of July, 1936. Buying in this line has been sustained, too, with the normal seasonal decline from June levels not as severe as usual. Cadillac-LaSalle reports a similar condition, with its more popular cars doing a lot to keep sales at an all-time high, 49.3 per cent above the 1929 peak. Studebaker sales for July were 4387, more than three times as great as last July.

Of course, all sales this year and this summer have been at breathtaking heights but, dropping down a bit in the scale, we find that the Pontiac gain, for instance, is only 28 per cent. If prices become too steep, there undoubtedly will be a tendency to buy back into this range. Unfortunately for any attempt at continued comparison down the line, the influence of the strikes on Chevrolet and Plymouth dealer stocks never has been overcome completely, so these two lag while Ford, unhampered last year by labor problems of the violent sort, shows what might be an abnormal gain. The Ford gain is indicative of the comparison with the more expensive cars, however, since it is running about 20 per cent.

With this Monday set as time for resumption of Ford production and Wednesday chalked up by the UAW as a sort of zero hour in its attempt to unionize the Ford plants, a great deal of interest centers on the River Rouge front. It has been learned that Ford plans to produce 110,000 to 150,000 of the old (1937) model cars before he changes over to 1938 model production. At the rate of 6000 cars a



day, which the plants can attain easily, this means 18 to 25 days' work. The change-over can be expected any day after Labor Day. Whether the plant will close for any appreciable length of time then is problematical. New features are relatively few, and dies and tooling for them have been virtually complete for weeks. It will be a time to pause and size up the labor situation again, and what is apparent then may be the determining factor in the announcement date of the new Ford.

Dearborn authorities jarred the UAW more than a little by refusing police protection for pamphlet distributers on the ground that they were unable to find any legal record of the existence of the UAW. When the city corporation counsel replied to a request from Maurice Sugar, UAW attorney, for a permit to distribute literature this Wednesday, with protection, he said:

"In view of this situation, we are forced to conclude that the named confederation on whose behalf you communicate with the Chief of Police is a legal nonentity. . . ."

As a result of the previous pamphleteering at the Rouge, the Dearborn Safety Commission decided last Friday to prefer charges against six members of the police force whose dismissals have been recommended by Common Pleas Judge Ralph W. Liddy. It was the decision of the corporation counsel that the preferring of charges was mandatory if the legality of Liddy's grand jury investigation could be upheld.

In connection with plans to distribute literature at the plant gates this Wednesday, there has been a strong union sentiment against going out "to look for trouble." The sentiment was based on the belief that Ford anti-union workmen, rather than Ford service men, would meet the unionists. Any clash of this sort, it was admitted, would stir up publicity favorable to Ford, whereas the previous engagement, with Ford guards, gave the union a story to tell before the NLRB.

Observation of the present relationships between the UAW and the Big Three of the auto business leads to the conclusion that there will be a lot of conversation, probably more strikes, before the real issue is settled. What the union is pointing to now as an immediate objective is the closed shop. This is true in the Plymouth plant, as recent developments indicate. It is also true in the case of General Motors, which just now is continuing its discussions with the union on the subject of guarantees that there will be no further interruptions of production. It looks now as though all of the Big Three will be dealing with the union on this and similar subjects at the same time and they may see fit to cooperate, whereas last winter and spring there were times when it seemed to many that they were working at cross-purposes.

After it finally had cleared the way for a legal adjournment to mark the death of Governor Murphy's compromise labor relations bill, the Legislature learns now that another extra session will be called, probably in October. Only the votes of three members of his own party can be blamed for the defeat of the bill, so Murphy has hopes that by October he can get what he wants. The final compromise, which got a 14-14 vote in the Senate, was just like the bill vetoed a short time before, except that picketing provisions were liberalized to satisfy the unions.

Several important industrial developments have come to light. Willard H. Dow, the president of the Dow Chemical Co., of Midland, revealed recently in his annual re-

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REGISTRATIONS of the big three 1937 production models (U. S. passenger cars only)

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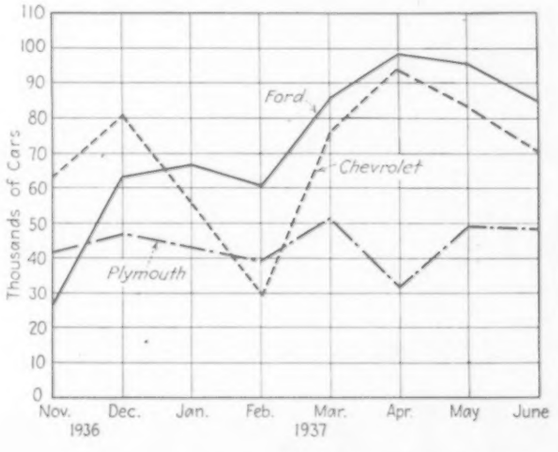

Here is real gaging economy based on FACTS!

The following is an exact quotation from a letter sent to us by a user of Pratt & Whitney Chromium Plated Plug Gages . . . . . .

"We use in the course of a normal year approximately 200 1¼" cylindrical plug ends at a cost of $4.00 each, or $800.00 for the year. These plugs are used to check automobile gears, and because of the close tolerances do not last for more than 1000 pieces.

"About 4 months ago we sent two plugs to the Pratt & Whitney Company to be chromium plated and have been using them since. To date we have checked 5000 gears with each plug, and can from all appearances do several thousand more. With a normal year and assuming that 5000 pieces is the maximum life of a plug, we would use only 60 at a cost of $8.00 each, or $480.00 per year—making a saving of $320.00 per year."

You can make a similar saving with these chromium plated plug gages. They are available in all sizes—big and little—and everything in between. May we send you complete information?

Pratt & Whitney

Division Niles-Bement-Pond Company

HARTFORD, CONN.

A well known tool engineer recently said . . . . . .

"I can honestly say that the amount of my salary is saved yearly through using Pratt & Whitney Chromium Plated Plug Gages."

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PRATT & WHITNEY
Chromium Plated
PLUG GAGES

port to stockholders that he anticipates expansion of the business running into millions of dollars for construction. No plans or detailed explanations are available, but the program for the last year, $3,753,000, foreshadows the possible expenditure ahead. At Lansing a new company, the Centrifugal Fusing Co., is taking over a new three-quarter million dollar foundry designed to operate in conjunction with Motor Wheel Corp., also of Lansing, to produce centrifugally lined and fused brake drums for automobiles. The plant was designed and equipped by the Campbell, Wyant & Cannon Foundry Co., of Muskegon, which has handled similar production of Ford drums in one of its Muskegon foundries. The plant is the property of Motor Wheel Corp., and is held under lease by the new concern. Experimental operations have been carried on for several weeks in the plant, said to be the only one of its type in the world. Production will be more than 30,000 tons of centrifugally fused iron each year. Formerly, rolled steel rings manufactured in Lansing have been shipped to Muskegon for the casting, then returned to Lansing for machining. At Milford, near the General Motors proving ground, Ford has announced plans to erect a dam and power plant, the power to be utilized for the operation of another small factory of the Ford "village industry" type.

Linden, N. J., is to be the site of another automotive supplier's plant. Mather Spring Co., of Toledo, will build a branch there to serve Eastern branch assembly plants of the automobile industry. Incidentally, from Toledo comes word that the Toledo furnace plant of the Interlake Iron Co. has shipped approximately 42,000 tons of iron to Europe in four months. Canadian lake freighters have been handling the iron as far as Montreal, where it is transhipped to England, France, and Switzerland. Small shipments have been taken out by water for Belgium and Japan.

Seamen on the Great Lakes are being approached now when they dock at Detroit by organizers for the National Maritime Union, CIO affiliate. This city, along with 10 others on the Lakes, has been designated as a recruiting center. The union's representatives say that contracts will be submitted to operators before this season ends.

The Board of Commerce employment index for Detroit took a plunge the first of the month because of Ford's layoff and that in plants of Ford suppliers. From the relatively high level of 117.3 it dropped to 83.5, the lowest for the year. The drop was even more pronounced than last year's low of 83.9, reached the first of October.

The Plymouth shut-down was important in its effects on the week's total of automobile assemblies. According to Ward's Automotive Reports, output totaled 79,736 passenger cars and trucks for the United States and Canada, compared with 86,403 last week and 84,153 for the corresponding week last year. The service predicts a bulge in the production curve to about 100,000 next week, with Ford operating again.

As things stand now, those not operating are Packard, Oldsmobile and Studebaker. This week, Cadillac-LaSalle, Lincoln and Nash are due to shut down.

The Cadillac-LaSalle closing marks the end of the most successful year that concern has experienced, its total of 46,000 cars being about 15 per cent above its best previous model year. While the plant is stilled, a new press department will be set up, with modern presses arranged in a line to handle continuous production. In addition to providing machinery and tools to build a new V-16 engine (the 12 and 8 remain the same as last year's) Cadillac will install a $45,000 conveyer system to handle bodies on a mass-assembly basis. There will be a new inclosed platform where the receipt of bodies can be increased from 18 to 50 an hour.

Packard's change-over, now nearing completion, is one of the most extensive in the industry. With sales and profits up (the first six months of the year brought nearly $300,000 more net profit than the same period a year ago) the company is setting out to make its position even stronger by offering some interesting new models and by further improvements in manufacturing methods. The popular priced Packard cars will be lower and will have wider bodies with all-steel tops and there will be a redesigned engine and new rear suspension. Much of the delay in getting back into production is attributed by Packard to the extent of new equipment purchases made recently. In a plant where production per square foot already is at a peak for the industry, more machinery is being added (and much replaced).

The Plymouth division of the Chrysler Corp. returned 10,000 workers to their jobs Monday following a ratification of agreement that settled difficulty between the UAW and the company. The pact affected 7000 men at Briggs Mfg. Co. as well as 10,000 at Plymouth.

ALINEMENT of engine, clutch and transmission depends in great degree on the accuracy in machining housing facings. Simultaneous milling of this flywheel and clutch housing is done by Buick on this hydromatic machine.

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available. Boldface Type Indicates Changes This Week

	June 1937	May 1937	June 1936	Six Months 1936	Six Months 1937
Raw Materials:					
Lake ore consumption (gross tons)[a]	4,639,733	‡5,339,925	3,763,289	19,612,326	29,373,959
Coke production (net tons)[b]	.....	4,798,511	3,787,711	21,295,300	.....
Pig iron:					
Pig iron output—monthly (gross tons)[c]	3,107,506	3,537,231	2,586,240	13,528,226	19,706,593
Pig iron output—daily (gross tons)[c]	103,584	114,104	86,208	74,331	108,876
Castings:					
Malleable castings—production (net tons)[d]	54,026	55,960	43,766	274,092	**351,855**
Malleable castings—orders (net tons)[d]	43,141	‡46,018	42,848	265,055	**334,858**
Steel castings—production (net tons)[d]	**101,239**	95,995	70,323	341,582	**596,561**
Steel castings—orders (net tons)[d]	**71,817**	68,688	94,345	423,544	**608,908**
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	4,183,762	5,135,559	3,984,845	21,326,335	28,764,633
Steel ingot production—weekly average (gross tons)[e]	875,236	1,163,332	926,706	817,997	1,111,891
Steel ingot production—per cent of capacity[e]	74.46	88.82	70.75	62.45	84.89
Finished steel:					
Trackwork shipments (net tons)[e]	9,194	8,807	6,507	34,592	54,008
Fabricated shape orders (net tons)[g]	169,792	‡121,481	‡132,387	‡761,976	909,313
Fabricated shape shipments (net tons)[g]	140,125	‡137,683	‡154,470	‡692,244	769,560
Fabricated plate orders (net tons)[d]	34,833	28,913	52,937	231,407	251,245
U. S. Steel Corp. shipments (tons)[h]	1,268,550	1,304,039	886,065	5,031,350	7,614,274
Ohio River steel shipments (net tons)[i]	147,100	102,200	109,455	465,621	657,690
Fabricated Products:					
Automobile production, U. S. and Canada[k]	521,139	540,357	470,887	2,596,356	2,917,420
Construction contracts, 37 Eastern States[l]	$318,137,100	$244,112,800	$233,054,600	$1,237,731,000	$1,494,514,300
Steel barrel shipments (number)[d]	929,536	786,607	708,069	3,902,716	5,326,327
Steel furniture shipments (dollars)[d]	**2,183,481**	2,302,350	1,470,195	9,211,418	13,710,186
Steel boiler orders (sq. ft.)[d]	**719,008**	1,005,591	1,130,886	‡4,650,605	5,453,309
Locomotive orders (number)[m]	22	14	24	122	228
Freight car orders (number)[m]	528	3,903	4,320	26,554	45,090
Machine tool index[n]	191.8	208.5	128.8	†124.5	†227.6
Foundry equipment index[o]	228.2	237.6	141.4	†146.9	†226.1
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	.....	49,050	59,910	319,145	.....
Imports of pig iron (gross tons)[p]	.....	6,361	16,793	97,507	.....
Imports of all rolled steel (gross tons)[p]	.....	29,031	15,715	123,768	.....
Total iron and steel exports (gross tons)[p]	.....	1,043,489	294,951	1,631,591	.....
Exports of all rolled steel (gross tons)[p]	.....	279,699	100,303	533,490	.....
Exports of finished steel (gross tons)[p]	.....	164,192	89,287	487,314	.....
Exports of scrap (gross tons)[p]	.....	630,671	186,696	1,050,273	.....
British production:					
British pig iron production (gross tons)[r]	699,300	696,300	644,100	3,749,100	4,011,000
British steel ingot production (gross tons)[r]	1,106,400	1,047,300	965,900	5,744,200	6,338,400
Non-ferrous Metals:					
Lead production (net tons)[s]	40,156	‡42,605	38,818	224,015	254,134
Lead shipments (net tons)[s]	42,710	55,212	37,736	215,737	312,640
Zinc production (net tons)[t]	50,526	55,012	44,947	253,732	280,590
Zinc shipments (net tons)[t]	50,219	55,201	41,654	252,487	319,464
Deliveries of tin (gross tons)[v]	6,645	6,425	7,795	37,020	44,435
Copper production, refined (net tons)[w]	86,016	95,265	60,562	356,180	487,465

* Preliminary. † Three months' average. ‡ Revised.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corp.; [i] United States Engineer, Pittsburgh; [k] When preliminary from Automobile Manufacturers Association—Final figures from Bureau of Census; [l] F. W. Dodge Corp.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange; [w] Copper Institute.

The Iron Age Weekly Index of Capital Goods Activity

(1925-27 = 100)

Last week	97.2	Same week 1934	50.9
Preceding week	96.4	Same week 1933	61.1
Same week last month	94.4	Same week 1932	33.8
Same week 1936	86.6	Same week 1931	58.9
Same week 1935	57.1	Same week 1930	89.0
Same week	124.7		

ACTIVITY in the production and distribution of durable goods showed a gain of 0.8 points for the week ended Aug. 7, according to THE IRON AGE seasonally adjusted index. As in the previous week, the gain is due largely to seasonal adjustments, indicating that business in these lines is being maintained at a higher rate than is normally the case. Automotive production, for example, showed an 8 per cent decline, whereas the normal seasonal decline is 12 per cent at this time. Ingot output held its own, also against the seasonal trend. Gains were recorded in the basic factors of carloadings of forest products, and in the Pittsburgh composite index, the latter, due to an increase in both water and rail shipments at that center. The production factor was practically unchanged. Heavy engineering construction dollar volume was off, and the decline affected the 13-week moving average, but again seasonal factors tended to offset this decline.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	85.0	+0.0
Automobile production (number of cars and trucks)	79,736	—6,667
Railroad loadings of forest products (number of cars)	42,770	+871
Pittsburgh industrial production and shipments (index number)	106.5	+0.6
Construction contracts awarded (total value)	$44,041,000	—$3,352,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

WASHINGTON. . . . . .

. . . National Labor Standards Board appears to have a complex job ahead of it which only supermen could be expected to accomplish.

° ° °

. . . What industry fears most from the new legislation is the return of New Deal regimentation, also exemplified in proposed agricultural control legislation.

° ° °

. . . Sit-down strike as a labor weapon may have passed out; Governor Murphy, who once condoned it, now condemns it; A F of L gains from public resentment against CIO.

° ° °

By L. W. MOFFETT

Resident Washington Editor
The Iron Age

° ° °

WASHINGTON, Aug. 10.—After the five god-like men are appointed to the National Labor Standards Board what is ahead? That is what industry is wondering and fearing. It's not the wage-hour provisions of the so-called Black-Connery bill, now evidently greased by William Green at the suggestion of the President for enactment, that cause widespread concern. For, while they may well develop some serious dislocations, they will not affect the vast bulk of employment. It's not the "objective" that is a matter of worry. On the contrary, the proclaimed objective of striking at the sweatshop deserves and has hearty approval of industry in general.

The thing that worries is that the wage-hour legislation is legislation that means the New Deal is on the way back to regimentation. Dumped into the ash can by the Supreme Court, the tread of industrial and agricultural goose-stepping under bureaucratic command again is heard. A little thing like a Supreme Court decision invalidating a law or laws is nothing to the palpitating regimenters. They sneer, scoff and whine at the Supreme Court, whether deciding by a unanimous vote as it did in the case of the disreputable Blue Eagle, or by a divided vote as it did in the case of the notorious Treasury plundering AAA. Instead of discrediting the Court in the eyes of the public the effect has been to increase the public's veneration for the Court and to decrease respect for its detractors.

This reaction was manifest before the Court packing plan was given the knockout, but that shellacking gave high emphasis to public regard for the Supreme Court. Nevertheless covert efforts for packing the Court still are being persistently made. Just so with prospective regimentation, which, if it is to survive, must have a sympathetic Court, unless it falls of its own weight, as NRA and AAA did before formal burial by the Court.

Legality in Doubt

Legal minds differ, as they so often do, as to the constitutionality of the wage-hour bill. Certainly it is more carefully drawn than NRA with its wild grant for rampaging bureaucratic control of industry. As passed by the Senate and as redrafted in some important essentials for House consideration, the legislation might make the judicial rapids—or it might not. It definitely delegates wide power to the Labor Standards Board and as amended to organized labor.

Oncoming resurrected agricultural regimentation, inspired by political freebooting — raiding the much-raided Treasury, soaked deeply in red ink, which is getting redder, with its mountainous debt of $36,700,000,000 and its ever-rising deficit. For it will be agricultural regimentation in a wide scale just as before. Control and price stabalization for cotton will be just the starter. Other agricultural blocs will demand theirs and will receive Administration support, if indeed the initiative is not

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taken by the Administration, with an eye on Congressional elections next year. The Supreme Court, even if not streamlined to the regimentation model, at least will not get a crack at it until it has gotten well under way and until after the elections, which accounts for the urge for Congress to enact farm legislation at the next session, seeing that the movement for a special fall session was scotched.

Meanwhile the wage-hour legislation, apparently on the eve of passage, is feared not merely because of the confusion and disturbance it probably will mean as a force blocking continued industrial recovery because of the impossible job it gives the "superhuman" Labor Standards Board. Even more serious is its implication. This implication is that it will be followed at a subsequent session of Congress for further legislation which will point to price and production control, as is planned again with respect to agriculture, but, fortunately, with no subsidies from industry. It is not likely, judging from precedent, that bureaucracy will ever be satisfied with what it starts with. It always wants more, a fact that has been especially conspicuous in the present-day totalitarian-state obsession that prevails in Washington.

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Law Difficult to Administer

Perhaps the most reassuring thing in the whole situation is that this Administration of the law will develop such tremendous complexities that, like the NRA, it will prove an impossible task and it will fold up under the weight of bureaucracy. Much will depend on the Labor Standards Board personnel. It is given the power to snoop into every industry in the country. It can establish an advisory committee to go on a fishing expedition into each and every one of them. Likewise under Green's collective bargaining amendment the board is subject to labor dictation as to wages and hours. And once a Government body is set up it not only takes advantage of all its powers but often exceeds them.

God-like, indeed, it will have to be if it makes a go of the proposed regimentation.

Franklin Delano Roosevelt has said it would take god-like men to execute regulation and legislation by "master minds." That, of course, was before god-like men ruled in Washington.

When Governor of New York, Roosevelt in a nation-wide broadcast, in March, 1930, spoke these wise words:

"The doctrine of regulation and legislation by 'master minds' in whose judgment and will all the people may gladly and quietly acquiesce has been too glaringly apparent at Washington during these last 10 years.

"Were it possible to find 'master minds' so unselfish, so willing to decide unhesitatingly against their own personal interests or private prejudices; men almost god-like in their ability to hold the scales of Justice with an even hand, such a government might be to the interest of the country, but there are none such on our political horizon, and cannot expect a complete reversal of all the teachings of history."

This was before the days of the god-like Brain Trust and its anointed satellites who give Divine guidance to the nation today. And it was before the Madison Square Garden speech wherein Roosevelt elected himself master.

Borah Attacks Farm Control

LIMITING and controlling production never has worked, nor has price control, as shown by past

experience. Though, of course, the thing in the minds of those who again are urging this principle for agriculture is "vote catching." Oftenest production and price control work in the opposite direction from that intended. This point was brought out by Senator Borah, Republican, of Idaho, last Thursday in the course of comment on the proposed farm legislation. Since Senator Borah is well known for his blasts against monopolies and big business, it is certain that he cannot be charged with having been inspired by big business in his criticism of the legislation. His criticism was directed at limited production of the American farmer while continuing to import on the continuously enlarged scale the foreign products of cheap labor countries. Obviously what Senator Borah said with regard to control of farm production applies with equal force to industrial production.

Said Mr. Borah:

"To me it seems to be perfectly suicidal to be driving two teams in opposite directions upon the same road. A collision is inevitable. Senators are now talking about limiting production and decreasing acreage, and yet they are extending as rapidly as possible the reciprocal trade agreements, which have for their purpose and objective importing into this country the cheap agricultural products of other nations.

"If we are going to work out a program of reduction, let us not import the products of other countries where labor is paid about one-third or one-fourth of the amount the American farmer has to pay for labor. There is only one reason for reducing acreage, and that is because the market will not take the large production. Is there, then, either reason or justice or economic wisdom in turning over a part of that market to foreign production? With reduction certainly should go the doctrine that the American market belongs to the American producer to the full extent of his ability to supply it."

Sit-down Strike Condemned by Former Apologists

"I THINK the sit-down is over with. It is not right, and in a democratic form of government it is not necessary."—Gov. Frank Murphy of Michigan.

Governor Murphy was the first American public official who had to deal with the sit-down strike on a mass basis. Hence his opinion as to the passing of the sit-down strike should carry weight. At the same time the Governor may be engaging in hazardous prophecy. It is to be remembered that this technique of kidnapping property to coerce employers into capitulation had its genesis in an irresponsible group. That being the case its course is not safely predictable. However, there is a good basis for the Governor's views. The sit-downers certainly have eased up. The newness has worn off. The stunt has lost its headline appeal. Instead of being effective it has been one of the greatest forces which many think will hasten the disintegration of John L. Lewis's grandiose CIO, now clearly on a fast down-grade. Lewis, while overestimated as a labor leader, did not institute the sit-down strike, because he is too smart to set up such a repugnant self-destroying vehicle. There is every evidence that the sit-down strike is one of the many other lawless forces developing from CIO which got beyond the control of Lewis. Not that Lewis is a softie as a labor leader by any stretch of the imagination, but he is too experienced to have permitted, if he

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could have prevented them, the many excesses of the Frankenstein which he has built. He has lost control. And a leaderless organization is no organization at all. It is a mob.

But even the mob has seen public opinion turn hotly on the sit-down strike and on CIO lawlessness generally. This is the overwhelming power that is crushing CIO. It is a force more impelling than court decisions. It is the force that has converted public officials in their labor views—at least for the public records. The former tolerance and even condonation of the sit-down strike by public officials has given way under the element of public condemnation either to silence or guarded criticism. Even Madam Perkins who originally condoned the sit-down strike—at least by implication—on the specious argument that it had not been declared illegal, now admits its illegality. It took a court decision before she conceded what was generally taken as a matter of course. But the decision was only a medium of convenience. It was public opinion which forced the shifted position of the Madam, though she is not alone. Governor Murphy has joined the ranks. Higher-ups have done likewise. And because they no longer give 100 per cent support to CIO, there are distinct signs of a wide-open breach between Lewis and the New Deal such as may prove history making.

AFofL Gaining Strength

The sit-down strike, ironically enough, is proving a bonanza for the American Federation of Labor. Its leaders are cashing in bountifully on the public resentment against its bitter rival (CIO) growing out of the sit-down, as well as from the violence and irresponsibility of CIO.

AFofL leaders have intelligently and realistically sized up the sit-down strike and condemn it both for the purpose of tearing down CIO and building up AFofL.

The AFofL condemns the sit-down strike:

Because it is illegal.

Because it destroys discipline and, therefore, organization. For inasmuch as the sit-down strike means disregard for law, it follows that sit-downers will not submit to discipline at the hands of their leaders.

Homer Martin, fully aware that his UAWU sit-downers have almost destroyed the outfit, is desperately claiming his organization now can guarantee observance of contracts with automobile manufacturers. After conferring with Lewis he uttered pious words attempting to put the brand of integrity on an organization whose record for breaches of contract is unparalleled in labor-management history. Hardly had the words been spoken before UAWA tied up the Chrysler Plymouth plant. Martin, naturally, is having a tough time selling his story of UAWU "reformation" to employers. They want pledges that the suddenly acquired sanctity is not merely a matter of expediency to be discarded after negotiations are completed.

Railroads Expect No Large Buying Programs Before Next Spring

WASHINGTON, Aug. 10.—It is the view in railroad circles here that there will be no large purchases of equipment before next spring. This opinion prevails despite the progressively high freight carloadings and in face of the fact that near at hand is the peak of loadings, reached between Sept. 15 and Oct. 15 when heavy movements of crops, fuel and Christmas supplies occur.

While there is still a belief in some quarters that carloadings will rise approximately to 900,000 weekly in October, other estimates indicate that this is probably an excess of about 30,000. The higher figure, if attained, is not expected by those who think it an overestimate to prevail for more than a week or so. In such a case it would not be an important factor in the car supply situation, because of its flexibility which provides for ready readjustment by rapid car transfers such as can be made by the present-day modernized railroad plant, with its increased speed and quicker handling. But even granting the higher figure will be reached, railroad interests say carriers are adequately equipped to handle the traffic. Manifestly orders placed now could not be executed in time to place additional equipment in service for the fall movement.

That Class I railroads, in response to improved industrial activity with accompanying greater demand, have added to their plant is shown by official figures of the Association of American Railroads. They disclose that in the first six months of 1937 railroads installed 34,187 new freight cars, the largest number for any corresponding period since 1930, while on July 1 the number of new freight cars on

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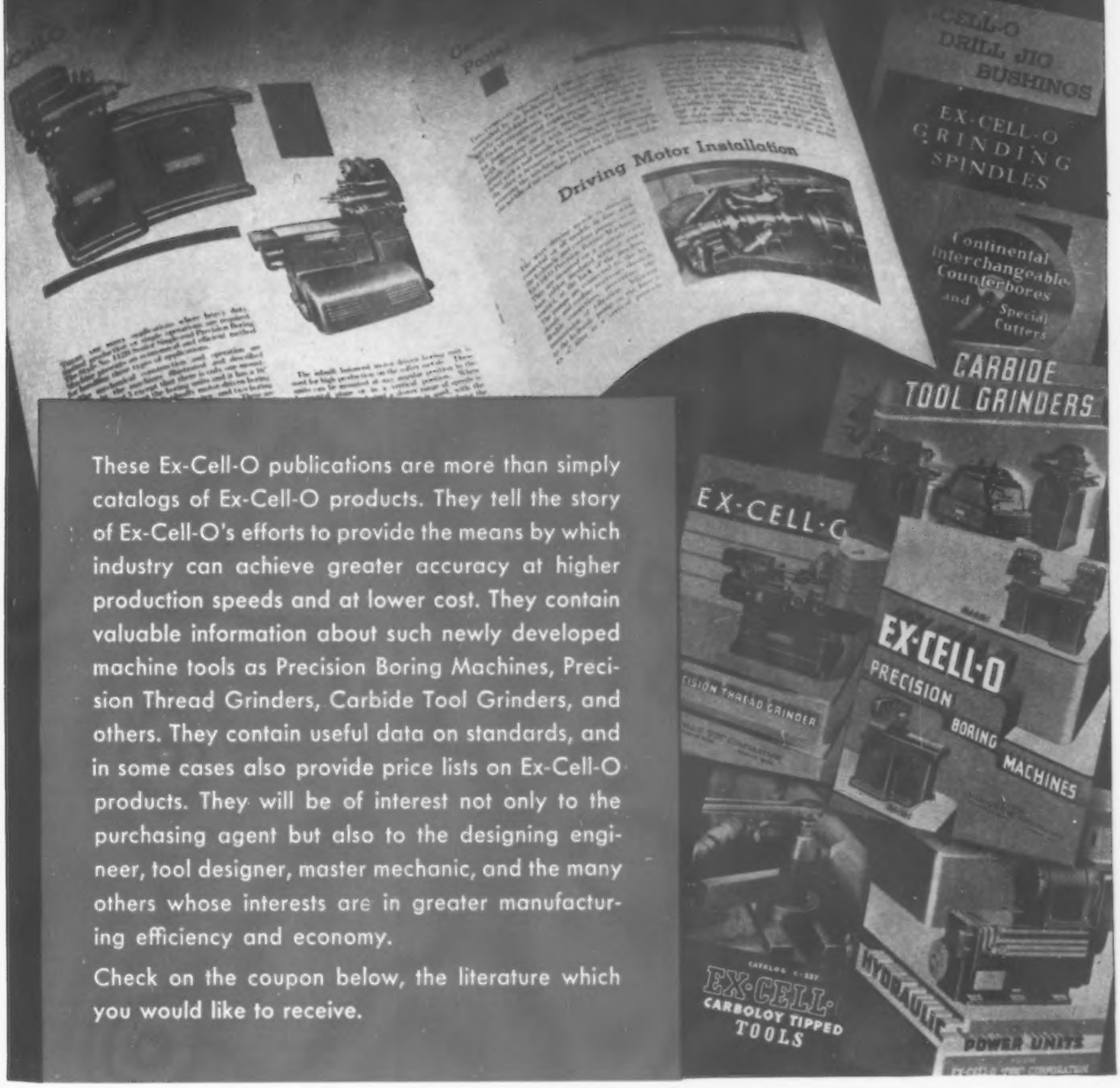

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order totaled 42,624, the greatest number for any corresponding date since 1924. At the end of the first half of 1937 the total number of freight cars owned or leased by the railroads was 1,729,199, with an aggregate carrying capacity of 84,940,928 net tons, a slight drop in the number of cars but an almost identical carrying capacity when compared with the 1,731,159, with a carrying capacity of 84,919,614 tons, owned or leased on Jan. 1. The difference in the number of cars owned or leased despite new purchases is accounted for by retirements. The cars on order obviously will increase the number of cars owned since they will more than offset retirements, and be available for the impending increased movements.

For several reasons, of course, the number of cars owned no longer is the criterion it was in earlier days of the ability of the railroads to serve shippers. Lighter alloys permit the building of individual units of greater capacity than formerly. Freight trains today move with a speed equivalent to the movement of old passenger train speeds, made possible by large capital expenditures to modernize locomotive and car equipment, tracks, terminal facilities and operating methods. The result is that railroads have greatly reduced car ownership, yet are able to meet shipper demands. A few highlights give a striking illustration of the situation.

At the end of 1925 the number of railroad-owned cars reached their peak of 2,363,849, or 632,690 more than the number owned on July 1 of the present year. The peak number had total capacity of 99,739,501 tons, an excess of 14,798,573 tons over the July 1, 1937, capacity. This is explained by the difference in average unit carrying capacity, which rose from 44.65 tons in 1925 to 49.12 tons in June of the present. Similar increase in speed has been made.

There has been an increase of more than 50 per cent in the speed of freight trains since 1920 and an increase in the same period of 33 per cent in the tractive effort of freight locomotives. The average number of miles traveled daily per active freight locomotive in 1936 was 105.1 miles, the highest for any year. In 1920 the daily average was only 91.1 miles.

The rise in locomotive tractive power likewise has been sharp. In 1923 there were 64,659 railroad owned locomotives with an aggregate tractive power of 2,513,166,012 lb., or an average of 38,868 lb. In 1936 there were 44,564 locomotives with an aggregate tractive power of 2,182,061,466 lb. or an average of 48,965 lb.

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NLRB Hearing on Weirton Aug. 16

WASHINGTON, Aug. 10.—At the request of the SWOC, representing the Amalgamated Association of Iron, Steel and Tin Workers Union, the National Labor Relations Board has issued a complaint against Weirton Steel Co., charging violations of the Wagner Act. Hearing date has been set for Aug. 16 in New Cumberland, W. Va.

The complaint charges the company has been "interfering with, restraining and coercing its employees" and sets forth a number of other alleged violations including charges of "dominating the Government, administration of justice, business affairs and social relationship of Weirton, W. Va., to the serious prejudice of the liberties of the employees in the exercise of their rights of self-organization and collective bargaining."

Chain Belt Co., Milwaukee, has completed erection of a new building at its West Milwaukee plant that will house the machine shop and company offices. All machine operations, except the manufacture of steel and malleable chains and the finishing of sprocket wheels, are being moved from the Milwaukee works to the West Milwaukee plant.

. . PERSONALS . .

E. G. HOWELL, formerly vice-president, Erman-Howell & Co., Chicago, has been elected vice-president of Merchants Steel & Supply Co., 141 West Jackson Boulevard, Chicago, dealer in scrap materials and relaying rails. Mr. Howell began his business career in 1905 as an office boy in the Chicago office of the then Republic Iron & Steel Co., rising later to chief clerk and then to salesman for that organization. During the war, he was a captain of infantry, stationed at Camp Grant, Rockford, Ill. In 1919, Mr. Howell became assistant treasurer of Briggs & Turivas, Chicago, remaining there until 1922, when he joined the raw materials department of Hickman, Williams & Co., in Chicago, of which department he was appointed manager in 1925. From 1926 until June, 1937, Mr. Howell was with Erman-Howell & Co.

E. G. HOWELL

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DR. A. A. BATES has joined the staff of the Westinghouse research laboratories as manager of the chemical and metallurgical division. He was formerly professor of metallurgy at the Case School of Applied Science and served as consultant for a number of companies in the Cleveland area. Previously, he had been employed by the National Tube Co. and was also research metallurgist for the National Malleable & Steel Castings Co. Dr. Bates was graduated from Ohio Wesleyan in 1923. He then attended Case School and received a B.S. in metallurgy in 1923 and a master's degree in 1929. He received his doctor's degree in metallurgy from the Ecole de Metallurgie, University of Nancy, France, in 1930.

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E. S. CROSBY, since 1929 vice-president and general manager of the Johns-Manville International Corp., New York, has been elected president. Mr. Crosby joined Johns-Manville in 1928 when it absorbed the Celite Co., of which he was vice-president. A. R. FISHER, formerly manager of the largest factory in Manville, N. J., of Johns-Manville Products Corp., has been elected vice-president of the Products company. J. P. KOTTCAMP, who has been manager of the Mid-Western factory at Waukegan, Ill., has been made vice-president, as has also ALEXANDER CROMWELL, currently manager of the Pacific Coast manufacturing operations.

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EUGENE D. WILSON has been made district representative, with office at 703 Columbian Mutual Tower, Memphis, Tenn., for the Foote Brothers Gear & Machine Corp., Chicago.

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W. H. SCHERER, for the past 30 years with the Westinghouse Electric & Mfg. Co., has been made manager of the Holyoke, Mass., plant of the Worthington Pump & Machinery Corp., Harrison, N. J. At Holyoke, Mr. Scherer will be in charge of the manufacture of equipment recently transferred from the corporation's plants at

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Harrison and Buffalo. For the past 18 years he has been general superintendent of the Westinghouse East Springfield, Mass., works.

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HAROLD P. INGRAM has been made superintendent of maintenance, Homestead works, Carnegie-Illinois Steel Corp. He was formerly superintendent of the roll department. Mr. Ingram began his business career in the engineering department at the East Pittsburgh plant of Westinghouse Electric & Mfg. Co. in 1913. He entered the Homestead works as an apprentice roll turner in 1915. In 1920, following study at Carnegie Institute of Technology, he became roll draftsman and in 1928 was named superintendent of the roll department.

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W. H. STEWART has been made superintendent of the roll department, succeeding Mr. Ingram. He was formerly roll designer and draftsman. Mr. Stewart entered the employ of the American Steel & Wire Co. at Farrell, Pa., in 1928 following his graduation from the University of Pittsburgh as a mechanical engineer, and in 1929 was transferred to the wire company's Worcester, Mass., plant. He went to Homestead as roll designer in September, 1929, and continued in that capacity until his present appointment.

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ERNEST C. BARTELL, of Tarentum, Pa., has been appointed personnel director of Allegheny Steel Co.'s West Leechburg division. He was graduated from Princeton in 1927 and took two years postgraduate work after which time he became associated with the faculty and coaching staff of Phillip-Exeter academy, Exeter, N. H. From this position he joins the Allegheny Steel Co.

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LESSITER C. MILBURN, for many years vice-president of the Glenn L. Martin Co., Baltimore, is now works manager of the St. Louis division of the Curtiss-Wright Corp. He had been connected with the Martin company for 15 years, and holds numerous patents for airplane mechanical devices, including design features of the Martin bombers and the *China Clipper*. Mr. Milburn will be located at Robertson, Mo.

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FELIX W. A. KNOLL, previously chief engineer of the Chieftan Aircraft Corp., Centerbrook, Conn., is now in charge of engineering and production of the Crusader Aircraft Corp., Glendale, Cal.

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L. G. KNAPP, former factory manager of the Master Electric Co., Dayton, Ohio, has been named manager of the Sterling Products Co., Indianapolis.

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STUART G. BAITS, first vice-president of the Hudson Motor Car Co., Detroit, has also been named president of Hudson Motors of Canada. As such, he will have active charge of the plant in Tillsbury, Ont., and all Canadian operations. Mr. Baits has been connected with Hudson since 1915, when he was employed as a draftsman following his graduation from the University of Michigan.

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B. H. GILPIN, former factory manager of the Pratt & Whitney Aircraft Division of United Aircraft Corp., has joined the organization of the Eclipse Aviation

These new cranes travel at 170 feet per minute with a five ton load. They operate over the entire plant area interlocking for passage of hoists from bridge to bridge. Cranes and hoists are propelled by low horse power MonoTractors all from floor control.

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MARVIN MARSH, special sales representative for the American Rolling Mill Co., Middletown, Ohio, in the Kansas City territory since Jan. 1, 1935, has been named manager of the company's newly created district office at 7100 Roberts Street, Kansas City.

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H. M. WILCOX has been made manager of the newly-created new products division of the Westinghouse Electric & Mfg. Co. The new products division has been formed to develop lines of activity which either are new in the art or which have not been previously undertaken by the company. Functioning the same as the other operating units of the company, this division will include separate engineering, manufacturing and sales departments. Mr. Wilcox was formerly vice-president of Electrical Research Products, Inc., a subsidiary of the Western Electric Co., which was engaged in the development and exploitation of the patents of the American Telephone & Telegraph Co. outside of the telephone field. H. W. TENNEY has been made engineering manager, and GEORGE F. BEGOON, sales manager. Mr. Tenney joined the Westinghouse company in 1920 and entered the materials and process engineering department. The following year he held the various positions of section engineer and division engineer in charge of the high voltage laboratory, engineering laboratory, chemistry laboratory and central engineering laboratory building. In November, 1936, he was appointed manager of central engineering laboratory division. Mr. Begoon was first employed by Westinghouse in 1913. The following year he entered the work of the Westinghouse Electric International Co., in which he served until 1925 except for the period of the World War. For a time he was with National Aniline & Chemical Co., and from 1929 to 1937 with the Electrical Research Products, Inc. In April, this year, he rejoined Westinghouse in the New York industrial division.

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CARROLL F. BROWN has been appointed assistant director of personnel, Pittsburgh district, Carnegie-Illinois Steel Corp. He was formerly superintendent of industrial relations at the company's Farrell-Mercer tin plate works and has been with Carnegie-Illinois since 1918. Mr. Brown has been connected with industrial relations work since 1936.

CARL E. SWINDLER has been appointed district sales manager of the new office opened by Jones & Laughlin Steel Corp. at Tulsa, Okla. Mr. Swindler has been in the employ of Jones & Laughlin for a number of years and has been identified with the territory which the Tulsa office will serve.

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GEORGE A. MATTISON, JR., has been elected president of the Woodstock Slag Corp., succeeding his father, who died several months ago. Mr. Mattison, Jr., was previously general manager.

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CHARLES H. JENNINGS, engineer in charge of welding research, Westinghouse Electric & Mfg. Co., has sailed for England to act as consulting welding engineer for the English Electric Co. during the next three months. He will resume his duties at Westinghouse about Dec. 1. In addition to his research work Mr. Jennings supervises all electric welding in Westinghouse factories.

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L. P. RAY has been appointed superintendent of industrial relations at Carnegie-Illinois Steel Corp.'s Farrell works. He formerly held the same position at the Farrell steel works before the consolidation of it with the Farrell-Mercer tin mill plant. He has been associated with Carnegie-Illinois and preceding companies for the past 44 years, and has been connected with industrial relations work since 1933.

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In a machine cycle of 28 seconds, 9 surfaces are machined. 23 tools are mounted in 3 tool carrying members. There are 7 distinct tool movements as follows:

1 Rough cam-turn.
2 Rough face head, rough form ring grooves and ring groove lands.
3 Finish ring groove lands.
4 Chamfer all ring grooves.
5 Finish cam-turn.
6 Finish face head.
7 Finish grooves.

JONES & LAMSON MACHINE

...OBITUARY...

LEIGH B. MORRIS, who was formerly district sales manager in New York for the Cambria Steel Co. and the Midvale Steel & Ordnance Co., died recently in Los Angeles, where he had made his home for many years and where he represented a number of manufacturers in iron and steel products. Mr. Morris had been New York district sales manager of Cambria Steel Co. prior to the time it was merged with the Midvale Steel Co. and the Worth Brothers Co. as Midvale Steel & Ordnance Co. When the Midvale company was acquired by the Bethlehem Steel Co., Mr. Morris went to the Pacific Coast as sales representative there for Bethlehem. Later he engaged in business for himself. Mr. Morris was 64 years old and had spent nearly all of his business life in the steel industry.

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CHARLES H. KIRBY, former vice-president in charge of engineering for the Marvel Carburetor Co., was buried Aug. 2, at Flint, Mich. Mr. Kirby, who was 50 years old, was with Marvel from 1921 until 1934, when he resigned to enter business for himself. He organized the Industrial Engineering Co., of Flint.

WILLIAM H. TUCK, for 20 years comptroller of the Ludlum Steel Co., Watervliet, N. Y., died at Round Lake, N. Y., after a long illness on Aug. 8, aged 70 years. Before being associated with the Ludlum company, he served as efficiency engineer with the Westinghouse Electric & Mfg. Co. and with the Consolidated Car Heating Co.

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JOHN H. SMITH, president and treasurer of the American Steel Engineering Co., Philadelphia, died suddenly on July 25. He began his business career with the Twin City Transit Co., and was at one time manager of the Dallas, Tex., office of the Truscon Steel Co. In 1919, Mr. Smith formed the American Engineering company and in 1929 built the present fabricating plant.

F. W. SARGENT, chief engineer of the American Brake Shoe & Foundry Co., whose death was announced in these columns last week.

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FREDERICK W. GIBBINS, founder of the Eagle Tin Plate Works of Great Britain and managing director until 1921, when Baldwins acquired the plant, died last week at the age of 76.

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DAVID J. SCOTT, chief clerk, bar and strip production bureau of the Carnegie-Illinois Steel Corp., died at Pittsburgh on Aug. 3, aged 56 years. Mr. Scott was an employee of the corporation or its predecessors for 38 years, having first been employed by the American Steel Hoop Co. in 1899.

Timken Steel & Tube Co. Division of the Timken Roller Bearing Co. has placed an order with the Amsler-Morton Co., Pittsburgh, for one large soaking pit furnace.

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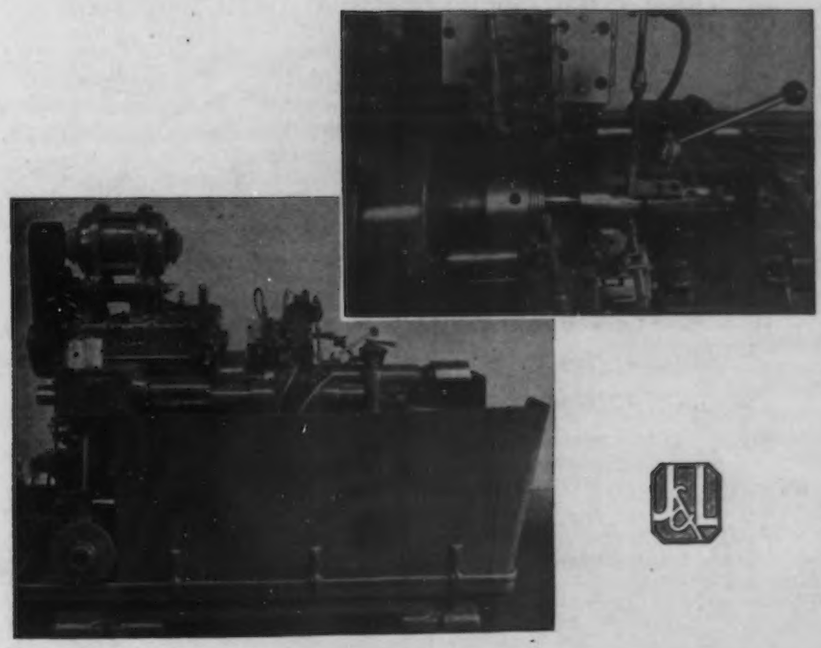

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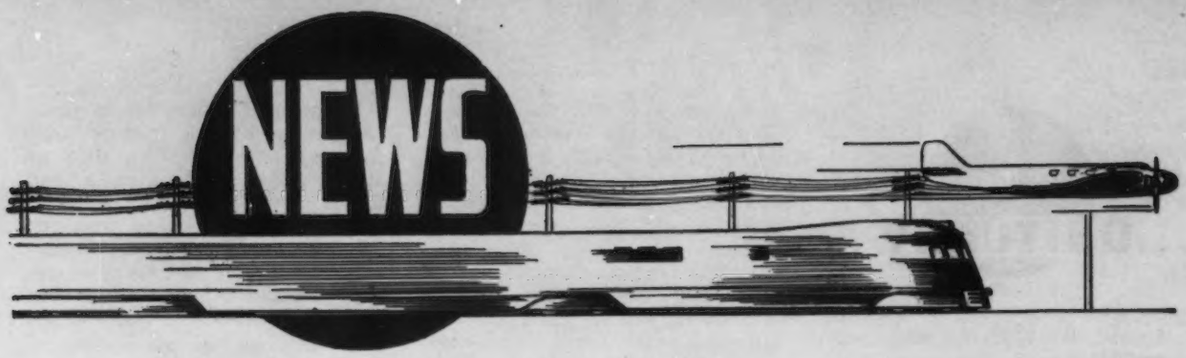

1937 Pig Iron and Steel Exports Exceed Those for First Half of 1929; Scrap Outgo 2,172,660 Tons in Half Year

WASHINGTON, Aug. 10.—Not only did June exports of iron and steel products (excluding scrap) from the United States—306,237 gross tons valued at $17,900,048—sharply exceed June, 1936, shipments (195 per cent in quantity and 137 per cent in value), but they also climbed substantially (51 per cent and 11.4 per cent respectively) over the totals reached in the corresponding month of 1929, according to preliminary information released by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce. In comparison with the May, 1937, trade, however, slight declines of 7.5 per cent in quantity and 6.7 per cent in value were recorded.

Pig iron continued as the leading item shipped on a tonnage basis, its total of 105,194 tons comparing with 117,598 tons in the previous month, and with only 91 tons in the corresponding one of 1936. Next came unfabricated plate 31,585 tons (25,738 tons and 3922 tons), followed by black steel sheets 25,029 tons (23,747 tons and 10,771 tons), tin plate and taggers' tin 23,207 tons (28,414 tons and 26,596 tons), ingots, blooms, etc., 19,753 tons (25,387 tons and 1682 tons), steel bars 12,670 tons (12,954 tons and 3316 tons), and plain shapes 11,623 tons (8677 tons and 6057 tons).

Pig iron shipments recorded the outstanding decline (12,404 tons), when compared with the previous month's total, others of moment occurring in ingots (5634 tons), tin plate (5207 tons), heavy rails (4338 tons), wire rods (1904 tons), and skelp (1688 tons). The most prominent increase (5847 tons) was registered in exports of unfabricated plate, followed by those in plain shapes (2946 tons), galvanized sheets (1839 tons), hot rolled strip steel (1818 tons), relaying rails (1498 tons), and black steel sheets (1282 tons).

Exports (excluding scrap) in the first six months of the current year aggregated 1,370,033 tons valued at $85,889,363 and exceeded by a wide margin (147 per cent in quantity and 107 per cent in value) the totals for the corresponding period of 1936. Against the 1929 figures (1,339,725 tons valued at $102,371,400) a gain of 2.3 per cent was registered in volume, but the value was some 16 per cent lower.

Pig Iron Leads in Tonnage

In the first half of 1937, pig iron (305,851 tons) was also the outstanding product shipped on a tonnage basis (924 tons in the first six months of 1936), followed by tin plate 149,658 tons (131,706 tons), unfabricated plate 129,408 tons (28,095 tons), black steel sheets 123,045 tons (65,787 tons), steel bars 61,408 tons (25,777 tons), plain shapes 59,704 tons (25,573 tons), ingots 58,860 tons (6883 tons), hot rolled strip steel 45,511 tons (17,209 tons), skelp 39,933 tons (18,362 tons), heavy rails 35,910 tons (29,732 tons), seamless casing and oil-line pipe 35,888 tons (8074 tons), and galvanized steel sheets 34,095 tons

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(28,420 tons). It will be noted that in all cases the 1937 trade was comfortably in excess of the 1936 totals.

From the standpoint of value, tin plate $15,947,820 ($13,013,766 in the first six months of 1936) was the leading product shipped, followed by black steel sheets $9,119,352 ($4,688,617), pig iron $7,369,772 ($23,908), unfabricated plate $5,474,214 ($1,216,235), steel bars $4,101,177 ($1,544,217), seamless casing and oil-line pipe $3,429,547 ($935,276), plain shapes $2,923,583 ($1,070,620), galvanized steel sheets $2,799,264 ($2,054,864), and ingots $2,618,017 ($192,419).

A number of years have elapsed since pig iron or steel ingot shipments from the United States were at the level which prevailed in the first half of 1937. In 1913, pig iron exports aggregated 277,648 tons valued at $4,026,206 and went mostly to Canada and Europe. In 1917 the total was 377,094 tons valued at $12,998,026 (although in the 12-month period ended June 30, 1917, they had aggregated 834,930 tons valued at $24,770,246). At that time, Japan's purchases were negligible. Thus far in 1937, the principal pig iron outlets have been Japan and the United Kingdom. In 1913, the average export price per ton of pig iron shipped from the United States was $14.50; in 1917 it had risen to $34.47, and in the first half of 1937 it was $24.10.

The trade in steel ingots during 1913 amounted to 91,847 tons valued at $2,200,248, and in 1917 the aggregate was 2,013,459 tons valued at $161,043,055 in both years Europe being by far the chief outlet. In those years, Japan was a negligible factor against its present position as a principal outlet. In 1913, the average export price per ton of steel ingots, blooms, billets, etc., exported was $23.96, increasing sharply to $79.98 in 1917, while in the first half of 1937 the quotation was $42.54.

Exports of scrap from the United States in 1913 totaled 97,429 tons valued at $1,276,558, increasing to 150,560 tons valued at $3,680,884 in 1917, with Europe and Canada the outstanding purchasers. Since 1917 scrap, because of its relative cheapness coupled with the endeavors which have been made to conserve iron ore as much as possible, has become extremely important in lieu of pig iron for producing steel ingots.

Scrap Exports at High Level

In comparison with the export prices shown above for pig iron and ingots, scrap exports in 1913 were quoted at $13.10, in 1917 at $24.45, and in the first half of 1937 at $19.80. Although the 1937 pig iron export trade of the United States is at an extremely high level, the steel ingot total is (and has been) far below the 1917 volume. Therefore, the gap between this year's trade in steel ingots as against 1917 and the immediate intervening years has been bridged by scrap, the excess being accounted for in a large part by the increased steel consumption since 1917 all over the world. Consequently, the described situation in a large measure accounts for the steady expansion which has been registered in the United States export trade in scrap iron and steel.

Scrap exports in June maintained their exceptionally high level when 520,297 tons valued at $10,493,433 were dispatched. Those totals were somewhat below the 638,108-ton trade valued at $13,608,219 in May but far in excess of the 191,173 tons valued at $2,568,004 shipped in June, 1936. In the first six months of the current year the scrap aggregate was 2,172,660 tons valued at $43,026,925 in comparison with 1,072,028 tons valued at $13,052,193 shipped during the like period of 1936. The 1937 half-year volume was some 200,000 tons in excess of the figure reached in the entire year 1936.

Republic Plants at Pre-Strike Activity; Girdler Sees CIO Slipping

ALL Republic plants are operating at normal capacity at present and earnings for August and September should return to pre-strike levels, T. M. Girdler, Republic Steel Corp. chairman, declared in a press interview following his return from a short vacation in Massachusetts. "Furthermore," he said, "Republic emerged from the labor difficulties on a basis of cordial relationship with its workers, none of whom are now on strike.

"At the low point of the strike our operations were at about 28 per cent of capacity," Mr. Girdler stated. "Our operations were stepped up during the first week of July, with the strike ended, and by the end of the month were at 80 per cent. Now we are running between 80 and 85 per cent, and are employing between 45,000 and 50,000 men."

Discussing future operations, he said, "I believe a big steel business lies ahead, in which Republic should participate because of its wide representation in many types of lighter steel construction. There is a strong demand for steel and actually a world-wide shortage exists. We have sold some finished steel abroad and could have sold a great deal more but for the necessity of taking care of our domestic customers.

"We are bargaining collectively with our workers, just as we have done for a long time. Many of our workers doubtless belong individually to various AFofL craft unions or to the CIO. Neither of these organizations represents our men, however. It is my sincere belief that not 1 per cent of Republic's employees are paying dues to the CIO at this time. As a matter of fact, now that the time is coming for the payment of dues, I believe the CIO is slipping wherever it made any progress in the past."

Steel Castings Show Upturn in June

BOTH orders and production of steel castings showed an upturn in June over the May volume, according to the Department of Commerce. June orders totaled 71,817 net tons, as compared with 68,688 tons in May, and with 94,345 tons in June, 1936. The peak month of 1937 was March, when 158,079 tons of castings were booked. Orders for the first six months rose to 608,908 net tons, as against 423,544 tons for the January-June period in 1936.

June production totaled 101,239 tons, as compared with 95,995 tons in May and with 70,323 in June, 1936. The peak month for production in the first half of 1937 was also reached in March, when 111,525 tons were cast. For the six months, 596,561 tons were produced, as against 341,582 tons during the comparable period in 1936.

The Middletown Iron & Steel Co., subsidiary of David J. Joseph Co., Cincinnati scrap dealer, which recently made a long-term contract as sole supplier of scrap to the Middletown, Ohio, plant of the American Rolling Mill Co., has signed a similar contract to supply scrap to the company's Ashland, Ky., plant.

German Government to Develop Native Low-Grade Ore Deposits

LONDON (*Special Correspondence*).—The German Government announces its entry of the iron and steel industry through the medium of the Reichswerke A.G. für Erzbergbau und Eisenhutten General Goering, which is to recover and smelt the native iron ore hitherto neglected by private enterprise. The company will commence operations in the Salzgitter region, Brunswick, where three smelting plants are to be erected in Franconia and Brunswick.

The formation of the new enterprise was announced by General Goering at a meeting of representatives of the iron and steel producing and consuming industries, iron merchants, and the building industry. Its duties, he explained, were derived from an order issued by himself as Commissioner of the Four-Year Plan, which empowers him to unite persons owning mining rights and claims in a company controlled by the State. The rights and claims are to be exchanged for shares in the company, which will take over the mining of the ore. It is understood, however, that the company will operate its right of purchase only in those cases where the owners have done nothing to recover the ore.

The State company is empowered also to erect and operate processing and smelting works, and has already delegated this work to a company directed by Herr Brassert, one of the leading experts in iron production. The board of the Reichswerke A.G. is composed mainly of officials of various ministries, with one representative of private industry. The orginal capital is being put up by the State, but it will be open to private concerns to subscribe capital other than in the form of mines or mining rights later.

Germany's deposits of iron ore are extensive and widely scattered, but low in iron content, and no claim is made that the country can replace from its own soil the 18,000,000 tons which were imported last year. But in view of the needs of the Four-Year Plan it is held to be essential to exploit domestic resources to the full, especially as, it is claimed, the discovery of new processes has made the smelting of native low grade ores an economic proposition.

German Steel Rationed

Germany is suffering acutely from the shortage of iron and steel. Industries are rationed, but except for armament purposes are not at present receiving their full quotas. Automobile production has had to be restricted, building operations have been delayed—a permit is required for any works needing more than two tons of iron—and, as it is pointed out, iron and steel are essentials for the construction of the plants which are to produce the new synthetic raw materials under the Four-Year plan.

Therefore the State finds it immediately necessary to supplement the efforts of private enterprise in the mining of native ore. Last year only 6 per cent of German requirements were obtained at home, but by the end of the Four-

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Year Plan it is anticipated that Germany, although still a heavy importer, will be independent of "foreign dictation."

The new development is not expected to have any effect upon the position of Germany in the international steel cartel. It is believed that the cartel is far too valuable to Germany to permit of her doing anything that would endanger it. It has been pointed out in London that the German iron and steel industry itself is already strictly controlled as to output, prices, etc., so that it is unlikely that the new measures will have effect upon the organization of the industry as a whole.

The State's entry into the industry is, of course, largely designed to overcome the reluctance of the German ironmasters to make full use of native ore. In the past endeavors have been made in this direction by means of a subsidy for those using the domestic product. Because of the poor quality of the local ore, which necessitated the use of an unusually large quantity of coke in its smelting, makers were unwilling to work with it, even with the inducement of the subsidy.

Anxiety Over Ore Supplies

Recently there has been great anxiety in Germany in regard to future ore supplies from France. In the past Germany has taken vast quantities of ore from Lorraine. There has recently been a considerable rise in the price of Lorraine ores and some difficulty in placing contracts. Moreover, as a result of the new French licensing system, it was thought possible that the existing French contracts might shortly be terminated.

Germany's arrangements with France for the supply of ore are at present upon a provisional basis. For May and June of this year she was able to arrange only for a similar tonnage delivery as she had imported in March and April. The French authorities desired to control the price of ore exports to Germany according to the value of German coking coal and coke, but this has not met with favor in Germany.

Germany is known to have big ore contracts with Sweden, Spain and Newfoundland as well as with France. It is likely that, as a result of her increasing needs, she will redouble her efforts to secure supplies from Spain and Morocco. The recent report that Germany had concluded an agreement with General Franco for a monopoly of the supply of Spanish iron ore has aroused interest in Britain and has led to questions being asked in Parliament. However, Oliver Stanley, President of the Board of Trade, states that he has no information concerning any such agreement. Any interference with British ore supplies from Spain would, of course, increase the difficulties of British producers.

According to optimistic statistics recently issued by the German Government, the German soil has 500,000,000 tons of iron ore which can be smelted without difficulty, and 1,100,000,000 tons of iron ore for which only a partially satisfactory method of preparation has yet been evolved.

German deposits already being mined are located on the Upper Danube, in Baden, north of the Harz mountains, and on the Sieg and Lahn rivers. All these deposits are low grade and much depends on the process by which they are treated. Several processes have already been put to a practical successful test, such as the Krupp-Gruson and the Mannesmann-Sachleben, and the latter has acquired special importance as it yields manganese.

The German press is divided in its opinion about the entry of the Government into the industry. The *Frankfurter Zeitung* carefully points out that the Reichswerke A.G. is not to be regarded as an experiment in the socialization of industry, but rather as a joint undertaking for the solution of a peculiar problem. The economic development of the ore resources,

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says the paper, requires the consolidation of wide-scattered claims. Presumably this can be most quickly achieved by the intervention of the State. The *Frankfurter Zeitung* expects that if private enterprise, hitherto backward in this field, makes use of possibilities still open to it of participating in ore mining, either through the State company or on its own account, this branch of the industry may yet be restored wholly to private control.

On the other hand, the Nazi party organ, *Volkischer Beobachter*, asserts enthusiastically that National Socialism has taken steps to solve the iron and steel problem in spite of the industrialists, who "left the ore lying in the ground, although everyone knew that iron was necessary and short." The interests of the nation, according to this paper, will be much better served by the State enterprise than they would have been by a private company whose interests lay in opposing developments which involved readjustment of the structure of their industry.

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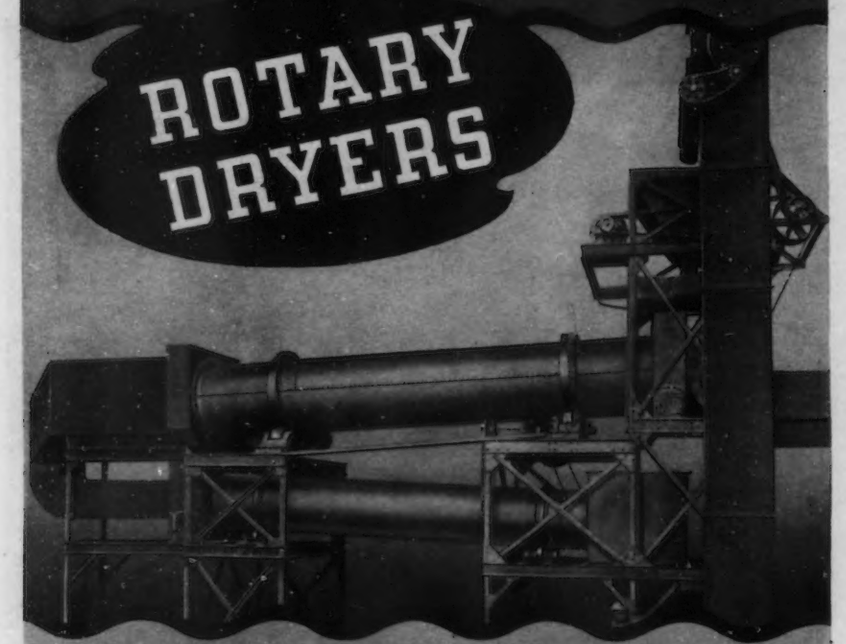

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Japan's Iron Output To Be Increased

TOKYO (*Special Correspondence*).—The goal of Japan's five-year plan for increasing iron production must be 10,000,000 metric tons instead of the 5,000,000 metric tons fixed under the original plan, Commerce and Industry Minister Shinji Yoshino informed the iron and steel committee of the Price Policy Commission.

"Taking the emergency situation into account, the Government must formulate a large-scale plan involving supply and demand in times of war and peace," the minister said.

"The surplus, if any, should be used for the manufacture of machine tools and for export to South America and other countries. Judging from the prevailing rate of consumption, Japan is likely to consume six and one-half to seven million metric tons of iron annually five years hence. The remaining three million tons should be exported," *Domei* quotes the minister as saying.

* * *

TOKYO (*Special Correspondence*).—The importance of North China, scene of the present Sino-Japanese crisis, is due to its resources of coal and iron ore, from the Japanese point of view. In the not unlikely event of an armed argument ending in Japan's favor, China will no doubt be compelled to recognize Japan's "special position" with regard to mineral interests in the five provinces of North China, namely, Hopei, Shantung, Shansi, Chahar, Suiyuan.

In iron, the province of Chahar by far leads all others. The deposits at Lungchieh are estimated at 45,000,000 tons as surveyed by Japanese experts, the rest (in the four other provinces) being given as 46,000,000 tons.

These are the most recent and probably best figures. They supersede earlier estimates which placed the total deposits at 185,844,000 tons.

U. S. Navy Department has awarded to Worthington Pump & Machinery Corp., Harrison, N. J., a contract for complete boiler feed and condenser pumping equipment for seven 1500-ton torpedo boat destroyers, totaling $511,000. These vessels, Nos. 402 to 408, are being built in the Navy Yards.

British Imports of Scrap Increasing

LONDON (*Special Correspondence*).—Heavy imports from the United States are increasing the intake of scrap, which in June was 123,300 tons, against 77,500 tons in June, 1936, and a monthly average last year of 90,400 tons. Scrap imported in 1935 averaged only 36,500 tons per month and ore imports 37,900 tons.

Foundry Conference Starts Sept. 30

THE fall technical foundry conference of the American Foundrymen's Association, to be held in cooperation with the Battelle Memorial Institute, will take place Sept. 30 and Oct. 1 at Columbus, Ohio. Papers on the technical phase of foundry production are to be delivered under the three main headings of steel, gray cast iron and non-ferrous. The tentative program includes discussions on "Effects of Aluminum on Physical Properties of Steel," "Effects of Chromium in Copper Base Alloys," and "Electric Furnace Irons." An inspection tour of the institute's research laboratories is planned.

Mercer Tube Out Of Receivership

MERCER Tube & Mfg. Co., Sharon, Pa., has been discharged from receivership by Federal Judge R. M. Gibson at Pittsburgh. The company has been in bankruptcy since 1933. The company's petition said that all creditors had been paid. Its plant has an annual capacity of 50,000 tons of buttweld pipe.

Unemployment Less In June by 167,000

UNEMPLOYMENT in the United States declined between May and June by more than 100,000 persons to a total in the latter month of 6,082,000 according to the latest report of the National Industrial Conference Board.

Total employment in all fields of private enterprise and in permanent Government bureaus, aggregating 46,910,000 persons in June, showed a net advance over the total for May of 167,000. The number of persons employed in non-agricultural activities aggregated 35,300,000 persons during the month and was practically unchanged in relation to the total in May. Agricultural employment increased by more than 160,000 persons.

Employment in manufacturing declined 259,000 persons during the month, but advances primarily in agriculture and construction and, to a lesser extent, in other fields more than compensated for the downturn.

The unemployment total in June was 2,251,000 less than in the same month last year. During the 12 months the Conference Board estimates a reabsorption of 2,843,000 persons into the nation's employed labor force. The total labor force was estimated to have increased by 592,000 persons in the interim.

General Refractories Co., Philadelphia, has appointed M. D. Larkin Co., Dayton, Ohio, as distributer in the Dayton area. The company will carry a complete stock of refractories.

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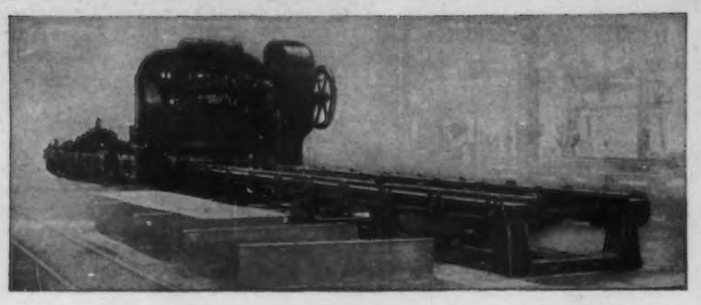

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FINANCIAL NOTES

Eastern Rolling Mill Co. earned $82,476 in second quarter after Federal income taxes, depreciation, etc., equal to 39c. a share on 210,000 shares of capital stock. This compares with net profits of $62,759, or 30c. per share in the first quarter, and net loss of $12,628 in the second quarter of 1936.

American Steel Foundries for the half year period ended June 30 had net profits of $2,412,153 after depreciation, Federal income taxes, minority interest and provisions for surtax on undistributed earnings. This was equal, after deducting requirements on the 7 per cent cumulative preferred stock which was retired on June 30, to $1.87 a share on 1,187,496 common shares. Net profits in a comparable period in 1936 amounted to $996,263, or 82c. a share on 970,414 shares of common stock.

Westinghouse Reports Large Bookings

WESTINGHOUSE ELECTRIC & MFG. CO. reports net profits of $11,331,772 for the six months ended June 30, as compared with earnings of $7,937,978 in a like period last year. Orders booked in the six months ended June 30 amounted to $142,209,475, and were 60 per cent above the total of $88,880,060 for the half year period in 1936. Sales billed for the six months were $101,861,631 as against $77,228,167 in 1936. Unfilled orders at June 30 totaled $83,725,878, representing the highest point in unfilled orders since September, 1920.

Gear Makers Will Meet Sept. 20-22

THE American Gear Manufacturers Association will hold its 20th semi-annual meeting at the Spink-Wawasee Hotel, Lake Wawasee, Ind., on Sept. 20, 21 and 22, according to an announcement made by J. C. McQuiston, secretary.

Remodeling of the Chicago foundry of the Link-Belt Co., which has been under way since March 15, will provide 40 per cent more floor area, rearrange and equip the various departments for maximum efficiency, and increase the capacity from 650 tons to 1000 tons of clean castings a month. Work will be completed about Oct. 1. Regular foundry operations have been carried on throughout the alteration process.

July Steel Output 9% Above June; Seven Months' Total Near 1929 Figure

STEEL production in July was 9 per cent higher than in June, reaching a total of 4,556,596 gross tons compared with 4,183,762 in the preceding month, according to the monthly report of the American Iron and Steel Institute.

Because of the three-day Independence Day holiday observed in many plants early in the month, the increase over June, when production was the lowest of any month this year because of strike conditions, does not represent the full extent of the increase in output following resumption of operations.

In the last three weeks in July operations in the industry averaged 83 per cent of capacity, whereas the average for the entire month was only 78.49 per cent of capacity. By comparison, operations in June were 74.46 per cent and in May, 88.82 per cent.

The July output was more than 16 per cent greater than the total of 3,914,370 gross tons produced in July, 1936, and the cumulative total for the first seven months of this year, 33,321,299 gross tons, was 32 per cent above the total for the same period of 1936. Total production in the first seven months of 1937 was only 1.7 per cent less than the 1929 figure of 33,886,857 gross tons.

Mackinac Bridge Still a Possibility

DETROIT, Aug. 10.—The Straits of Mackinac Bridge, considered a dead issue, assumed new importance after State Highway Commissioner Murray D. Van Wagoner made an offer of cooperation. Speaking Saturday at the dedication of State's newest ferry *City of Cheboygan*, Van Wagoner said Michigan would be engaged in a losing battle with traffic conditions at the Straits until a bridge is constructed. "The proposal no longer is an idle dream," he said.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS

(Reported by Companies Which in 1936 Made 98.29 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Monthly Production All Companies		Number of	Per Cent of Capacity
1936	Open-Hearth	Bessemer	Monthly	Weekly	Weeks	
January	2,794,766	196,389	3,039,804	686,186	4.43	52.39
February	2,707,320	202,445	2,956,891	714,225	4.14	54.53
March	3,094,939	185,040	3,333,853	752,563	4.43	57.46
1st Quarter	8,597,025	583,874	9,330,548	717,734	13.00	54.80
April	3,565,761	304,775	3,932,605	914,593	4.29	69.99
May	3,671,375	302,092	4,037,375	911,371	4.43	69.58
June	3,578,383	334,897	3,975,569	926,706	4.29	70.75
2nd Quarter	10,815,519	941,764	11,945,549	918,182	13.01	70.10
1st 6 Months	19,412,544	1,525,638	21,276,097	817,997	26.01	62.45
July	3,526,380	326,606	3,914,370	885,604	4.42	67.61
August	3,768,135	350,560	4,184,287	944,534	4.43	72.11
September	3,782,498	303,048	4,151,388	969,950	4.28	74.05
3rd Quarter	11,077,013	980,214	12,250,045	932,981	13.13	71.23
1st 9 Months	30,489,557	2,505,852	33,526,142	856,570	39.14	65.40
October	4,144,395	317,710	4,534,246	1,023,532	4.43	78.15
November	3,925,146	329,553	4,323,025	1,007,698	4.29	76.94
December	4,048,552	305,342	4,424,367	1,000,988	4.42	76.42
4th Quarter	12,118,093	952,605	13,281,638	1,010,779	13.14	77.17
Total Year	42,607,650	3,458,457	46,807,780	895,329	52.28	68.36
1937						
January	4,357,338	291,794	4,724,939	1,066,578	4.43	81.43
February	4,012,358	331,669	4,413,832	1,103,458	4.00	84.25
March	4,730,579	403,787	5,216,666	1,177,577	4.43	89.91
1st Quarter	13,100,275	1,027,250	14,355,437	1,116,286	12.86	85.23
April	4,601,620	390,198	5,071,875	1,182,255	4.29	90.27
May	4,685,749	386,290	5,153,559	1,163,332	4.43	88.82
June	3,832,514	284,572	4,183,762	975,236	4.29	74.46
2nd Quarter	13,119,883	1,061,060	14,409,196	1,107,548	13.01	84.56
1st 6 Months	26,220,158	2,088,310	28,764,633	1,111,891	25.87	84.89
July	4,148,389	336,035	4,556,596	1,030,904	4.42	78.49

1936 figures revised.

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Wage-Hour Bill Revised, May Pass House Despite Opposition of South; NRA Expert Predicts Bad Results

WASHINGTON, Aug. 10.—Reported favorably yesterday by the House Committee on Labor, the principal opposition in the House to the wage-hour bill will come from the South, as was the case when the bill was before the Senate, though the opposition is expected to be bowled over easily and the bill passed quickly. The chief fear of southern members is that the proposed Labor Standards Board, under pressure of organized labor, will narrow wage differentials and raise wages which will have the effect of depriving southern industries of advantages in cost of production such as they now enjoy. Wage-hour orders of the board cannot become effective until at least 120 days after enactment of the law. It provides for investigations and hearings.

Reflecting southern opposition was a statement given out by Representative E. E. Cox of Georgia. Mr. Cox made public a telegram he received from Dr. Charles F. Roos, who was Director of Research in the National Recovery Administration. Replying to a request of Mr. Cox for his opinion on the probable effect of the wage-hour bill on present wage scales, small businesses, labor self-organization, southern industries, total employment and volume of production, Dr. Roos described the bill as being similar to NRA, with some added definitions of policy, and predicted that its enactment would have disastrous results.

Will Curtail Employment

He said that it is his judgment that if the 40-hr. week is established and forced at this time it will lead to:

(1) Curtailed unemployment by at least one-half million within the first year of operation.

(2) Decrease in production and average standard of living.

(3) Lower consumption of raw materials including farm products and lower prices for them.

(4) Geographical realinment of industry.

(5) Higher production cost for farmers.

He declared that there is nothing in the experience with the operation of NRA to support the belief that the wage-hour legislation will obtain the objectives set and that on the contrary, insofar as it checks the production of wealth, it must adversely affect the average standard of living. Even those obtaining the sub-standard of wages now will not benefit, it was stated, if there is a check on the increase in total employment.

Dr. Roos declared that the soundest way to help labor is to stimulate enterprise, small and large, to increase production and the total volume of employment so that "we may have a high demand for labor resulting from an excess of jobs over workers."

Dr. Roos pointed out that from NRA a vast amount of statistical

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data was gathered showing that the introduction of a minimum wage always produced a high concentration of employees receiving exactly the minimum wage set. The wages of some were raised, it was stated, but the wages of a substantial percentage were lowered to the minimum. Therefore, Dr. Roos said, it is his judgment that the wage-hour bill will tend to level down the present wage scales. He said that data collected by the United States Census Bureau indicate that in some measure the heaviest burden of NRA wage increases fell on small industries.

South Would Bear Brunt

"Because the South has so many small cities and semi-rural communities in which small industries are not yet so highly mechanized as in large industrial centers where money wages are higher, the South would bear the brunt of this measure," said Dr. Roos. "But industries in small towns of the most populous states, New England, the Middle West, and elsewhere, will also be adversely affected for the same reasons. The dividing line is not the North versus the South, but the highly capitalized, highly mechanized industries versus the smaller industries in communities with lower cost of living, and therefore lower money wages."

Describing the bill as a "modest and conservative approach" to the social objectives of the Administration, the House Labor Committee reported the less stringent Senate draft to the House on Monday with the explanation that, although establishment of the 40-c. minimum is desirable as soon as possible, "such a minimum cannot immediately be established in all occupations in all sections of the country without producing some economic dislocations."

Examination of the bill disclosed that the committee allowed William Green, AF of L president, to write his own ticket after the White House had intervened and asked the committee to delay proceedings for one day to permit Green to submit some amendments which the White House approved "in principle."

Green's handiwork brought about an amendment protecting collective bargaining agreements by restricting the board's power to fix wages and hours only if they are above the prevailing local wage standards brought about by unionizing activities. He was also successful in asking the elimination of the label provision which he termed "a survival of the NRA blue eagle" and likely to interfere with the union label of the federation.

Madam Perkins' amendment requiring adherence to the wage-hour law by holders of Government contracts of $2000 and over, just as the Walsh-Healey Act stipulates wages and hours standards in present contracts of $10,000, was eliminated from the bill by the House Committee at Green's suggestion. This was regarded in some quarters as a direct rebuke to the Labor Secretary who, it is recalled, proposed the amendment to overcome overlapping difficulties between the two laws. Unquestionably such a revision would have broadened the Government contract law considerably.

The House Committee reported that the collective bargaining changes would aid labor in its organizing efforts which it said would be greatly strengthened by board powers against "chiseling employers."

Green Consulted, Lewis Silent

Green's eleventh hour appearance to save the bill from what many regarded as certain defeat was considered significant in view of his visit the day before at the White House. The Labor leader has made no secret of his preference for the Wagner housing bill over the wage-

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hour measure and had apparently all but forgotten about the Black-Connery bill until his White House visit.

Adding credence to the reported rift between the CIO chieftain, John L. Lewis, and the White House, Lewis's headquarters has been conspicuously silent on the wage-hour bill while Green's offices have buzzed with announcements, the latest of which calls the revised bill "a practical and constructive measure," and an "effective collective bargaining statute."

Informed sources say Mrs. Mary Norton, chairman of the House Committee, was bent on sidetracking the bill until summoned to the White House several weeks ago. Shortly after passage by the Senate, she termed the bill "no minimum wage law at all," since, in her opinion, it would not have been as effective a measure as the House draft. Her idea, she said, was minimum wages up to 70c. per hr. and maximum hours at 35, provisions which were favored by a slight margin in her committee until the Senate battle over the less drastic bill pointed to certain defeat of the House measure.

Estimates vary widely as to the number of workers to be covered by the bill if and when it becomes law. The discretionary powers given the administrative body makes it difficult for any accurate estimates, although they are placed at from 1,000,000 to 6,000,000 workers. But it is believed the board would have sufficient power to cover upward of six million persons, an objective at which the board might be expected to aim in an effort to justify its existence.

General Johnson, former keeper of the Blue Eagle, says the House bill with the Green amendments is "so grossly incompetent and so terribly dangerous that the only statesmanlike vote a congressman could cast is 'nay'." Johnson, like Roos, ought to know.

Firth Sees World Prosperity Ahead

LONDON *(Special Correspondence).*—The greatest confidence in the industrial outlook was expressed by Sir William Firth, chairman and managing director of Richard Thomas & Co. (the great Welsh steel and tinplate manufacturing combine), upon his reelection as president of the Swansea Metal Exchange.

Sir William, in the course of a lengthy address, referred to the fall in securities at a time when world business conditions had improved, unemployment had diminished and the risk of war had receded.

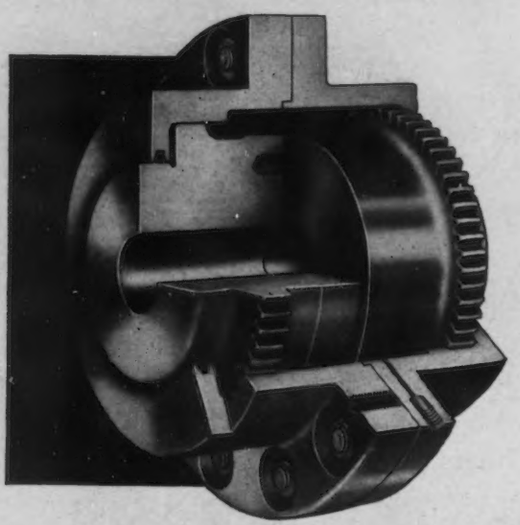
"Is a slump imminent?" he asked. "Are we in for another period of depression and unemployment? I do not think so. I think the fall in security values will do no more harm than act as a brake on thoughtless speculation. It will not seriously check improvement in demand.

"I firmly believe there are many factors in the world situation that point to stabilized prosperity for a long period. I believe prosperity is in the lap of an incoming wave of a breadth greater than anything seen before."

Finally, Sir William declared that the international activity in the building of armaments did not necessarily mean war. He thought, when the program was complete, it would bring peace.

"It must be realized," he added, "that, unsupported by armaments, a statesman's arguments carry insufficient weight in international discussions, just as arguments of the tinplate trade would, if unsupported by the ownership of a strip mill."

FARREL "*GEARFLEX*" COUPLINGS



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Wage Rates Are the Highest Where Technological Progress Is Greatest

AMERICA'S future progress will be very closely linked with the free development and use of inventions in its industries and agriculture, according to the Machinery Institute, sponsor of a series of studies on the relation of inventions to employment and living standards.

The average industrial worker in the United States uses 4.86 hp. of equipment as compared to 2.67 in Germany, 2.56 in Great Britain and 2.14 in Italy, according to reports from the International Labor Office, Geneva, Switzerland, cited by the institute. Real wages, according to the same source, were 160 per cent higher in the United States than in Germany, 90 per cent higher than in Great Britain, and 387 per cent higher than in Italy.

The institute found a close relationship between economic well-being and use of inventions in the various states of the Union as well as in nations of the world.

"Michigan, where aggressiveness in developing new inventions and instituting technological improvements is probably greatest, has the highest weekly factory wage in the United States, according to Department of Commerce reports," the institute stated. "In per capita income, New York, due to concentration of financial activity in New York City, ranks first, but it is followed next by Connecticut, which with Rhode Island is at the top in industrialization, measured by relation of manufacturing income to total income. Rhode Island's per capita income is exceeded by only three other states, one of which is California, whose motion picture stars owe their fortunes to technology.

"Mississippi, an agricultural state, which has the lowest per capita income in the nation, ranks at the bottom in percentage of farms equipped with tractors and almost at the bottom in per capita horsepower used by its industries."

Impossible to Forecast Results of Inventions

Referring to the 450,000-word report on "Technological Trends and National Policy," by the National Resources Committee and proposals to set up a national planning board to regulate inventions and mechanical progress, the institute stated:

"History has proved that society has more to gain than lose by freedom in the development of inventions and their application. Desirable as it might be to foresee the development of an invention, experience indicates that this is impossible, to say nothing of planning for the unpredictable results. Even the scientists themselves admit that those who have been considered most competent to judge the future of inventions have been wrong about as often as uninformed guesses would have been. Incalculable damage would be done if society had a method of officially vetoing the 'hunches' of such men as Edison and Ford.

"The most common fallacy in connection with technological development is to assume a direct relationship between productivity of a new machine or process and employment.

"Since the beginning of the cen-

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HOBBING STEEL

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tury output per worker in the iron and steel industry has increased more than 60 per cent, but instead of employment declining it has increased more than 100 per cent. There are machines enough in the American textile industry to spin more yarn and weave more cloth than could be made by all the women in the United States using the methods of Colonial housewives. Yet there have been more workers employed in the textile industry in recent years than ever before in history. These examples are typical of dozens which could be cited to show the tremendous increases in employment which have taken place while output per worker has increased."

Increased output per worker, the institute stated, has increased wages more than 100 per cent since 1914, and a study by the institute of prices of 20 widely-used machine-made commodities in terms of wages showed that the 1937 consumer enjoys a 62 per cent advantage over that of 1914.

Drilling and Tapping Costs
GRAND RAPIDS GRINDERS
Taps and drills cut faster when they are kept sharp —they last longer when they are correctly ground. Grand Rapids Grinders do the grinding in half the usual time and with a precision that eliminates tool breakage. They can save you money. We make many types and sizes in addition to the No. 10-B Combination Tap and Drill Grinder shown here.
Write for bulletin.

Shipbuilders' Council Defends Ship Cost

INCREASED costs of the new naval destroyers for which bids by private shipbuilders were recently opened were explained in a statement issued by the National Council of American Shipbuilders, New York. The statement pointed out that the ships are of a new design and somewhat heavier than the previous class on which bids were opened a year ago, and the increase in cost of material and equipment which the shipbuilders must buy from sub-contractors amounts to about 45 per cent over last year's figures.

"Navy estimates are merely estimates," the council said. "If a specific ship built in Navy yards costs one, two or three million more than the estimate, the taxpayer has to pay the difference because in any event the ship must be completed. On the other hand, if a private shipbuilder is wrong in his cost calculations, he and not the taxpayer bears the loss. It is also to be borne in mind that Navy yards, in making up their estimates, do not include as costs such items as social security taxes, which in the case of the recent battleship bids ran as high as one million dollars."

Cord Interests Sold to L. B. Manning Group

DETAILS of the sale of E. L. Cord's holdings in the Cord Corp. to a group including L. B. Manning, Emanuel & Co., and persons represented by Schroder, Rockefeller & Co., Inc., are said to include changing Auburn Automobile into a motor accessory plant as soon as the stock on hand at the Auburn plant is depleted. The new interests are reported to be desirous of concentrating on aviation through the Aviation Corp., and motor accessories through the Auburn company. Negotiations are understood to be under way for the fabrication of car bodies for Studebaker.

The new board of Cord Corp. will consist of T. M. Girdler, chairman of Republic Steel Corp., Victor Emanuel, L. B. Manning, R. S. Pruitt, C. C. Darling, G. E. Donovan and H. Lockhart. Mr. Emanuel will be chairman of the new board and Mr. Manning will be president.

8150 Tons Bars in Detroit Projects

DETROIT, Aug. 10.—Approximately 8150 tons reinforcing steel are involved in three city projects on which bids are due before the end of the month. The Baby Creek sewer project of the City of Detroit will require 3500 tons, due Sept. 1; primary sedimentation plants for sewage treatment plant requires 2400 tons, and bids are due Aug. 26; a pumping station and grid chamber project involving about 2250 tons of reinforcing steel and a possible 1100 tons of piling, plus 950 tons of structural steel will be bid Aug. 17. Steel piling in the pumping station is an alternate to poured foundation.

A large part of these city projects was under consideration about a year ago, but was delayed until now. Two more reinforcing bar projects, both private, are pending. One is a Sears, Roebuck & Co. store involving 600 tons, the other is a new Chrysler building, location unstated, 300 tons. Most recent award is J. L. Hudson Co. department store warehouse using 600 tons.

British Start Search For Native Ore

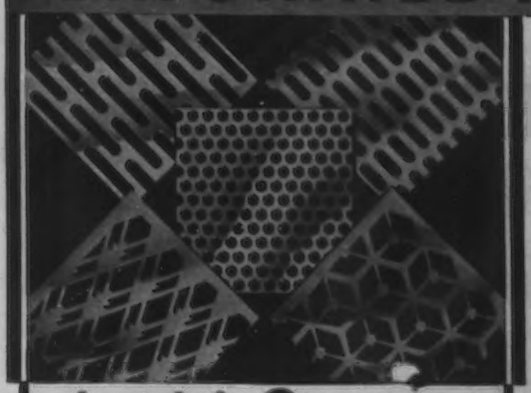
LONDON *(Special Correspondence)*.—Owners of property in Cumberland and Northumberland counties of England and in Wales, with the assistance of Government geologists, are carrying out an intensive search for high-grade iron ore. Since the start of the Spanish war, supplies of iron ore from the Bilbao and Santander districts have decreased until, a short time ago, they virtually ceased altogether. As a result the present search for alternative material has been initiated in the United Kingdom.

For many years iron ore was mined in the British Isles until, in the early seventies, Spain entered the market and eventually captured the bulk of the ore business. Now, however, many of the British mines, abandoned for years, are being reopened.

Numerous inquiries have been received by the British Geological Survey during the last few months. These have come from northwest England, South Wales, and Scotland. Large-scale maps of the districts have been provided and a staff of over 50 geologists has been giving advice on the reopening of old mines and the prospects of developing new ones.

Scientists attached to the Geological Survey are convinced that there are millions of tons of workable ore in the United Kingdom and that, whatever the outcome of the negotiations which are taking place between the British mine owners in Spain and General Franco's agents, sufficient iron ore can be obtained at home, although it is admitted that the quality is very variable.

PERFORATED METALS



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INDUSTRIAL—Whether your screening problems include very coarse or extremely fine materials, you will obtain the best results with perforated metal. H & K screens have increasingly served in all fields of industry for many years and established an unequaled standard in lasting performance. Regardless of size, metal or perforation, permit us to discuss your requirements with you.

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Only ARMSTRONG has the Drivelock.

Detachable but RIGID!

ARMSTRONG Socket Wrenches offer all of the advantages of quick assembly; drivers, handles, extensions, ratchets—the full range of sizes and in addition *rigidity*.

With the patented Drivelock ARMSTRONG has brought socket wrenches up to industrial standards of strength and safety. A quarter turn of the lock pin locks socket to driver, driver to ratchet, extension to extension. Build up a tool of any length—each unit locks securely to the others. Regardless of size or shape this "1-piece" assembly will not pull, pry or knock apart.

Chrome-Vanadium Sockets 5/32 in. to 5 in.—all types. Drop Forged Ratchets, handles, extensions and sets for all purposes.

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..CAST IRON PIPE..

Stephenson, Mich., plans about 4400 ft., various sizes, for water system; also new 50,000-gal. elevated steel tank and tower and other waterworks installation. Fund of $80,000 is being arranged through $25,000 bond issue, voted, and Federal aid, for this and sewer system. Shoecraft, Drury & McNamee, Ann Arbor, Mich., are consulting engineers.

Bradford, Pa., plans about five miles of various sized pipe for extensions in water system. J. B. Quirk is city engineer.

Waxhaw, N. C., plans 6 and 8-in. pipe for water system; also elevated steel tank and tower. Fund of $32,000 has been secured through Federal aid for this and other waterworks installation. J. B. McCrary & Co. of Virginia, Inc., Rosenburg Building, Roanoke, Va., is consulting engineer.

Creedmoor, N. C., plans pipe lines for water system. Fund of $24,000 is being arranged through bond issue for this and other waterworks installation.

Corpus Christi, Tex., plans main water line from Calallen water source to city limits. Special election will be called this month to approve bond issue of $750,000 for this and extensions and replacements in gas distributing system.

Tishomingo, Okla., plans trunk water line from source on Spring Creek, where new dam will be built. Entire project will cost about $60,000. Financing is being arranged through Federal aid.

Supervising Construction Engineer, Indian Service, Billings, Mont., asks bids until Aug. 16 for cast iron sewer pipe and fittings.

Oakland, Cal., has opened bids on 1040 tons, on which United States Pipe & Foundry Co. is low bidder on 880 tons of 4, 12, and 20-in.; American Cast Iron Pipe Co. is low bidder on 160 tons of 16-in.

San Diego, Cal., plans 30-in. pipe in Upas Street, from Thirtieth Street to Fifth Avenue, Balboa Park district, for main water supply. Cost about $115,000. Financing will be arranged through Federal aid. Robert Flack is city manager.

Taft, Cal., plans extensions in water pipe lines to cost about $25,000.

Vancouver, Wash., plans 8 and 12-in. pipe for extensions and replacements in pipe lines for commercial, industrial and fire protection systems; also two 250-gal. each elevated steel tanks and towers, and new 5,000,000-gal. reservoir. Appropriation will be arranged in connection with 1937-38 municipal improvements. Rex R. Osborn is city water superintendent.

AIRLESS

BLAST CLEANING EQUIPMENT

THE NEW PANGBORN ROTOBLAST "ROCKER" BARREL

An Airless Cleaning Machine Designed to Handle Flat, Mixed, Long and Fragile Work. Also All General Cleaning Work.

THIS compact Airless Barrel, with its Folding Conveyor Drum, is Pangborn's answer to the demand of industry for a super cleaning machine. Designed for flat, mixed, long and fragile work, as well as all the usual sizes and types of gray iron, steel, alloy and malleable castings; forgings; steel products and heat-treated parts, etc., this machine gives fast cleaning with low power, labor and maintenance costs. Made in 6 and 12 cubic feet capacity.

Write for Bulletin No. 209

PANGBORN CORPORATION · HAGERSTOWN, MARYLAND

THE WORLD'S LARGEST MANUFACTURER OF BLAST CLEANING AND DUST CONTROL EQUIPMENT

PANGBORN

..TRADE NOTES..

Chicago Pneumatic Tool Co., New York, has moved its Buffalo sales and service branch to 128 West Chippewa Street.

Inland Steel Co. has moved its St. Paul office into new quarters in the First National Bank building in that city.

Hickman, Williams & Co., Inc., New York, sales agents for pig iron, ferroalloys and coke, have moved to 300 Madison Avenue. Norman E. Craig is district manager.

Belt Guards for Atlas Lathes

NEW belt shields have been made available by the Atlas Press Co., Kalamazoo, Mich., for its 9 and 10 series lathes with self-contained countershaft. With these belt guards the complete transmission of any recent Atlas lathe is fully inclosed.

Both guards are aluminum castings with pin-hinges for quick raising and speed changes. It is not necessary to remove guards to change belts. The left guard covers the motor-to-countershaft belt and has a special inner guard for the pulley on the countershaft. The right guard covers belt from countershaft to lathe spindle.

FABRICATED STEEL

. . . Lettings in better volume at 26,800 tons compared with 13,000 tons last week.

o o o

. . . New projects decline to 9200 tons from 11,200 tons a week ago.

NORTH ATLANTIC STATES

Dummerston, Vt., 160 tons, State bridge, to American Bridge Co.

Walpole, Mass., 100 tons, manufacturing plant, to Providence Iron & Steel Co., Providence, R. I.

New Britain, Conn., 445 tons, factory building, Landers, Frary & Clark, to Berlin Construction Co., Berlin, Conn.

New York, 2100 tons, contract WB-4, Bronx-Whitestone bridge, to American Bridge Co., Pittsburgh.

Brooklyn, 300 tons, dumping platform, Pier No. 1, to Harris Structural Steel Co., Plainfield, N. J.

Flushing, N. Y., 265 tons, store, to Simon Holland & Son, Inc., Brooklyn.

Westchester County, N. Y., 480 tons, State highway bridge, to Ingalls Iron Works Co., Verona, Pa.

Belmont, N. Y., 120 tons, County court house, to F. L. Heughes & Co., Rochester, N. Y.

Schenectady, N. Y., 115 tons, broadcasting station WGY, to James McKinney & Son, Albany, N. Y.

Philadelphia, 100 tons, substation No. 8 for Philadelphia subway, to Belmont Iron Works, Philadelphia.

State College, Pa., 560 tons, college dormitory, to Anthracite Bridge Co., Scranton, Pa.

Scranton, Pa., 125 tons, bridge over Delaware, Lackawanna & Western tracks, to Pine Brook Iron Works, Scranton.

Erie, Pa., 260 tons, East Avenue bridge, to Fort Pitt Bridge Works Co., Pittsburgh.

Washington, 8870 tons, Government Printing Office, to American Bridge Co.

THE SOUTH

Louisville, Ky., 320 tons, underpasses, 18th and 21st Streets, to American Bridge Co.

Lexington, Ky., 700 tons, three tobacco warehouses for R. J. Reynolds Tobacco Co., to Belmont Iron Works.

Chickamauga, Tenn., 160 tons, four transmission towers, to Nashville Bridge Co., Nashville, Tenn.

Tulsa County, Okla., 140 tons, highway bridge, to Virginia Bridge Co., Roanoke, Va.

CENTRAL STATES

Port Huron, Mich., 4950 tons, main span International bridge, to American Bridge Co.; 2400 tons, approach, to Wisconsin Bridge Co., North Milwaukee.

St. Joseph, Mich., 450 tons, building and warehouse, 1900 Corp., to Joseph T. Ryerson & Son, Inc., Chicago.

River Rouge, Mich., 540 tons, open hearth furnaces, Ford Motor Co., to Pennsylvania Engineering Co., New Castle, Pa.

Detroit, 170 tons, buckstays, Ford Motor Co., to Babcock & Wilcox Co., Detroit.

Detroit, 130 tons, addition to service building, to R. C. Mahon Co., Detroit.

Cleveland, 320 tons, die shop craneway for Fisher Body Division, General Motors Corp., to Bethlehem Steel Co.

Canton, Ohio, 280 tons, Hoover Co. building, to Burger Iron Co., Akron, Ohio.

Evansville, Ind., 610 tons, extension to boiler house, to Milwaukee Bridge Co., Milwaukee.

Pike County, Ill., 165 tons, highway bridge, to A. C. Woods & Co., Rockport, Ill.

Buchanan County, Mo., 235 tons, bridge,

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PERKINS MAN COOLERS are easily moved by overhead crane, making them quickly available anywhere. By providing refreshing recirculation of air at the same temperature the men are working in, they maintain production in the hottest places. This means contented workers, fewer errors, fewer accidents. Made in OSCILLATING and STATIONARY types (both portable).

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to St. Joseph Structural Steel Co., St. Joseph, Mo.

Mercer County, Mo., 300 tons, highway bridge, to St. Joseph Structural Steel Co., St. Joseph, Mo.

Beatrice, Neb., 435 tons, Blue River bridge, to American Bridge Co.

WESTERN STATES

Shasta County, Cal., 470 tons, Lake Britton State highway bridge, to Moore Dry Dock Co., Oakland, Cal.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Orange, Mass., 110 tons, State bridge.

New York, 860 tons, Cudahy Packing Co. meat market.

Brooklyn, 520 tons, addition to school No. 140.

Brooklyn, 270 tons, school No. 222; Harris Structural Steel Co., Plainfield, N. J., low bidder.

Coxsackie, N. Y., 520 tons, building for Knaust Brothers.

Washington County, N. Y., 350 tons, State bridge RC-3898.

Washington, 420 tons, bridge over Bladenburg Road for District of Columbia.

THE SOUTH

Nashville, Tenn., 550 tons, third National Bank building.

Muskogee, Okla., 275 tons, post office.

Tulsa, Okla., 300 tons, Will Rogers High School.

CENTRAL STATES

Detroit, 150 tons, Chrysler Jefferson warehouse addition, Albert Kahn, Inc., Detroit, architect.

Flint, Mich., 225 tons, Hamilton Avenue bridge over Flint River.

Howell, Mich., 250 tons, grade separation.

Leelanau, Mich., 150 tons, State highway bridge over Lake Leelanau Channel.

Dundee, Mich., 190 tons, State bridge over Raisin River.

Silver City, Mich., 130 tons, State bridge over Iron River.

Ontonagon, Mich., 150 tons, State bridge over Ontonagon River.

Vassar, Mich., 170 tons, State bridge over Cass River.

Marquette, Mich., 100 tons, grade separation.

Peoria, Ill., 600 tons, building for Caterpillar Tractor Co.

Chicago, 220 tons, factory building for Tropic Aire, Inc.

Rockford, Ill., 1200 tons, buildings for Borg-Warner Corp.

Superior, Neb., 240 tons, State bridge.

WESTERN STATES

Buena Vista, Colo., 200 tons, State bridge PWA-54-C.

Eads, Colo., 250 tons, State bridge AW-4009-A.

State of Oregon, 455 tons, State highway bridges in Malheur and Multnomah Counties; bids Aug. 12.

Jackson County, Ore., 100 tons, Trail Creek National Forest highway bridge; bids taken Aug. 6.

Olympia, Wash., 125 tons, State highway bridges; bids taken Aug. 10.

FABRICATED PLATES

NEW PROJECTS

Medford-Everett, Mass., 800 tons, 48-in. water main for Metropolitan District Commission, Boston.

Polson, Mont., 450 tons, spillway gates for Rocky Mountain Power Co.

Bonneville, Ore., 700 tons, fishway gates.

San Francisco, 120 tons, first unit high pressure water system, San Francisco Bay Exposition; bids Aug. 12.

SHEET PILING

AWARDS

Buffalo, 315 tons, sewer project, to Bethlehem Steel Co., through L. A. Wells Construction Co., Cleveland, general contractor.

Knoxville, Tenn., 416 tons, Tennessee Valley Authority project to Carnegie-Illinois, Pittsburgh.

NEW PROJECTS

Long Island City, N. Y., 4350 tons, bearing piles for municipal airport.

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Hannifin "Heavy-Duty" air cylinders are honed to produce a mirror finish bore that is straight, round, and concentric within .001 in. Flanges are screwed on; then welded to the cylinder body. Heads are cast steel, with or without air cushion at either or both ends.

Available in a full range of standard sizes up to 16 in. bore, for any length stroke, air pressures to 250 lbs. Special sizes built to order. Write for Bulletin "A."

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HANNIFIN "Heavy-Duty" AIR CYLINDERS

MONTHLY SHIPMENTS OF FINISHED STEEL PRODUCTS BY UNITED STATES STEEL CORP.—TONS

Month	1933 Shipments	1933 Per Cent of Capacity	1934 Shipments	1934 Per Cent of Capacity	1935 Shipments	1935 Per Cent of Capacity	1936 Shipments	1936 Per Cent of Capacity	1937 Shipments	1937 Per Cent of Capacity
January	285,137	17.7	331,777	19.8	534,055	31.9	721,414	44.8	1,149,918	*75.4
February	275,929	18.5	385,500	25.9	583,137	39.2	676,315	45.3	1,133,724	82.5
March	256,793	15.3	588,209	35.2	668,056	41.5	783,552	50.5	1,414,399	92.7
April	335,321	21.6	643,009	41.5	591,728	36.7	979,907	63.2	1,343,644	91.0
May	455,302	27.1	745,063	44.5	598,915	35.8	984,097	63.4	1,304,039	85.5
June	603,937	37.4	985,337	61.2	578,108	36.7	886,065	57.1	1,268,550	85.8
July	701,322	45.1	369,938	23.9	547,794	34.0	950,851	61.3	1,186,752	77.9
August	668,155	39.8	378,023	22.6	624,497	37.3	923,703	59.6	.....	...
September	575,161	35.6	370,306	23.9	614,933	39.7	961,803	62.0	.....	...
October	572,897	35.5	343,962	20.6	686,741	41.1	1,007,417	62.6	.....	...
November	430,358	26.7	366,119	22.7	681,820	42.3	882,643	59.2	.....	...
December	600,639	38.7	418,630	27.0	661,515	42.7	1,067,365	68.8	.....	...
Plus or minus yearly adjustment	(+44,283)	...	(—19,907)	...	(—23,750)	...	(—40,859)	...	.....	...
Total for year	5,805,235	30.1	5,905,966	30.6	7,347,549	38.1	†10,784,273	58.2	.....	...

* Annual capacity 17,929,400 gross tons, with monthly percentages based on actual number of weeks in each month.
† Adjusted.

U. S. Steel Shipments in July Largest For That Month Since 1929

SHIPMENTS of finished steel products by United States Steel Corp. subsidiaries in July were 1,186,752 tons, a decline of 81,789 tons from the June total, but were the largest for any July since that month in 1929, when they were 1,338,944 tons.

In the seven months of this year shipments totaled 8,801,026 tons, an increase of 2,818,825 tons, or 47 per cent, above those of the same period in 1936.

Ask Exemption From Soft Coal Code

WASHINGTON, Aug. 10.—Representatives of the Carnegie-Illinois Steel Corp., appeared before the Bituminous Coal Commission at a public hearing today and asked exemption from the coal code on the grounds that coal produced by the company is not subject to the act.

The section of the coal act upon which they rely for exemption provides that the price-fixing provisions "shall not apply to coal consumed by the producer or to coal transported by the producer to himself for consumption by him."

The Vesta Coal Co., a Bethlehem Steel subsidiary, is scheduled to appear before the commission on Thursday to ask exemption on the same grounds. The Pittsburgh Steel Co. has asked to be heard on Aug. 16.

Genuine 18% Tungsten High Speed Steel
Tough Alloy Steel Back
Integrally Welded
a tauter blade means a straighter cut.
On any hack sawing machine, a tauter blade means a straighter cut . . . a High Speed Steel cutting edge means faster cutting . . . and an unbreakable blade guarantees uninterrupted production and a full cutting life.
MARVEL High-Speed Edge Hack Saw Blades offer all of these factors—permit cutting speeds, feed pressures, and blade tensions limited only by the sawing machine's capacities.
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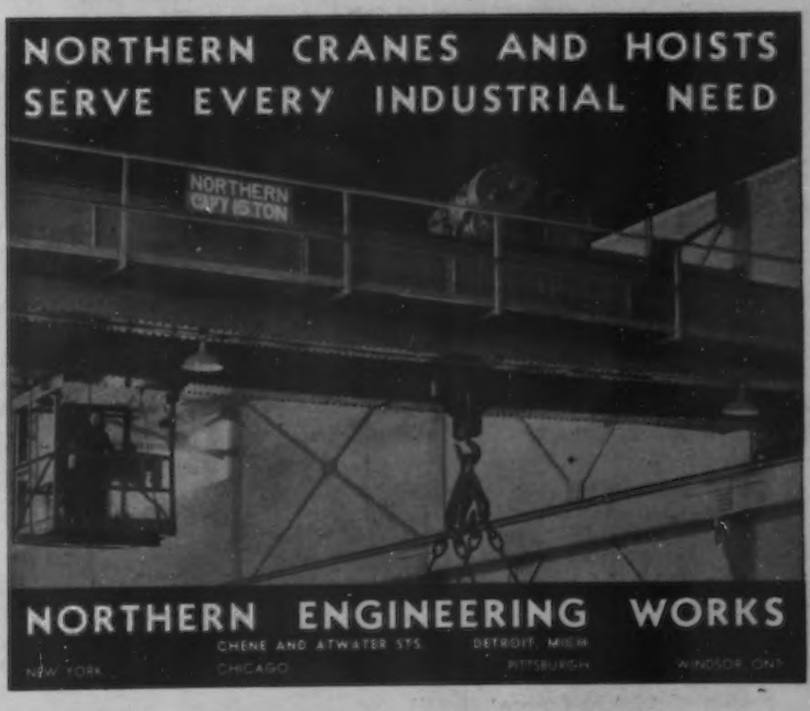
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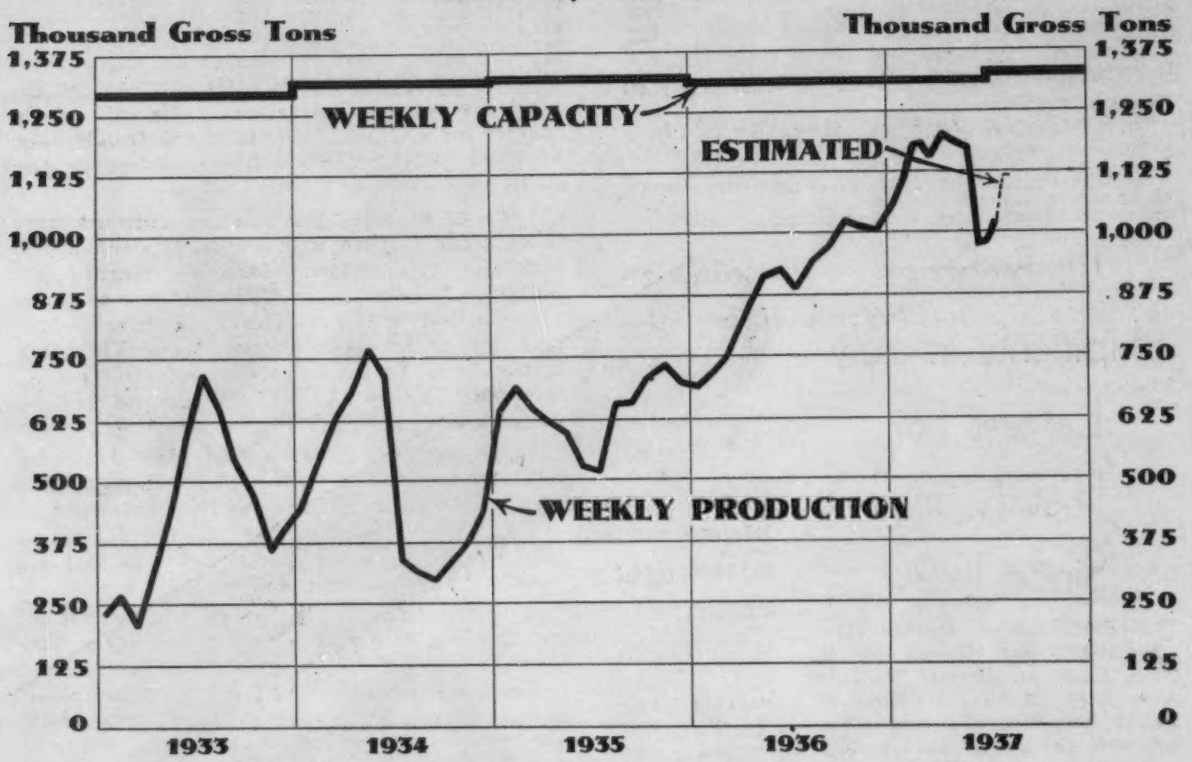
PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week	Last Week
Pittsburgh	83.0	84.0
Chicago	85.5	85.0
Valleys	85.0	85.0
Philadelphia	70.0	71.0
Cleveland	81.0	83.0
Buffalo	88.5	88.5
Wheeling	95.0	95.0
Southern	76.5	76.5
Ohio River	92.5	91.5
Western	95.0	95.0
St. Louis	76.5	76.5
Detroit	100.0	90.0
Eastern	70.0	70.0
Aggregate	84.5	85.0

Weekly Booking of Construction Steel

	Week Ended				Year to Date	
	Aug. 10, 1937	Aug. 3, 1937	July 13, 1937	Aug. 11, 1936	1937	1936
Fabricated structural steel awards	26,800	13,000	13,250	30,215	746,840	699,550
Fabricated plate awards	0	1,820	1,170	555	66,125	169,815
Steel sheet piling awards	730	0	0	2,705	36,285	36,680
Reinforcing bar awards	6,635	13,820	1,610	17,660	168,825	244,640
Total Lettings of Construction Steel	34,165	28,640	16,030	51,135	1,018,075	1,150,685

. . . . SUMMARY OF THE WEEK. . . .

. . . New business gains moderately at Chicago but is slow in other markets.

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. . . Operations off half-point to 84½%; backlogs declining, deliveries better.

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. . . Railroad equipment inquiries expected; steel scrap off at Chicago, higher elsewhere.

AS steel shipments are running considerably in excess of the volume of new business, backlogs continue to decline, with consequent improvement in deliveries. Steel ingot output for the country as a whole is estimated for this week at 84½ per cent, only a half point down from last week, but further slight adjustment downward is a possibility this month prior to the resumption of buying on a larger scale for early autumn requirements.

Only at Chicago have there been any indications of a reversal of the downward trend of new business, but even there the change for the better has been moderate, while elsewhere the end of the summer slump has not yet appeared. Two Chicago mills have increased their operations, bringing a half-point rise for the district to 85½ per cent. At Pittsburgh there has been a decline of a full point to an 83 per cent operation. In the Cleveland-Lorain district a two-point drop to 81 per cent has occurred. In other districts there has been no important change.

The continuance of high operating rates in the face of the year's low in shipments to the automobile industry and a relatively small volume of steel consumption for building construction points to an active fall trade, in the opinion of steel industry sales departments. While total production in the last half may fall below that of the first half, the net return to the steel companies will be greater because of a higher average level of billing prices.

PROSPECTS for a renewal of railroad equipment purchases are improving, although it may be next winter or spring before a buying movement equal to that of early 1937 is reached. At Chicago there are reports that several roads will shortly inquire for a total of 8000 to 10,000 freight cars, of which 5000 to 7000 will be required by two roads.

Lettings of steel for building purposes have taken a slight spurt, with a total of about 27,000 tons, of which 8870 tons is for a Government printing plant in Washington, 7350 tons for an international bridge at Port Huron, Mich., and 2100 tons for anchorages for the Bronx-Whitestone bridge, New York. Awards of reinforcing bars were 9800 tons on top of 14,000 tons the previous week. Sewer projects in Detroit call for 5700 tons.

There has been a renewal of interest in pipe lines. An order for 9400 tons of seamless pipe has been placed for a line in Louisiana for the Standard Oil Co. of Louisiana, and Shell Oil Corp. is inquiring for a 250-mile line of 8-in. pipe that will require 15,000 tons of skelp.

Automobile buying for new models has not yet run into large tonnages, but some orders have been placed for initial production, and larger orders are expected before the end of the month. With resumption of work at the Ford assembly plants this week following a three-week shutdown, 110,000 to 150,000 of the 1937 models will be turned out before production is started on 1938 models in early September. The Ford vacation together with the Plymouth strike carried last week's assemblies down to 79,736 cars, but a recovery to 100,000 is expected by next week.

Manufacturers of farm machinery and tractors continue to operate virtually at capacity and account in considerable measure for such improvement as has occurred in demand for steel at Chicago.

Tin plate mills are operating at 100 per cent, with can companies putting on pressure for shipments. Indications point to a record-breaking output of tin plate this year.

WITH pig iron prices for fourth quarter to be announced at the end of this month, the situation is not yet clear as to whether there will be an advance. Some large producers are opposed to any change in price, but much will depend on the extent of the upward movement in scrap prices.

Steel scrap at $22 a ton is 75c. higher at Pittsburgh, with the railroad grade having been sold at $24, but at Chicago there has been a decline of 50c., the recent rapid advance bringing at least a temporary surplus to market. The Philadelphia price is unchanged, but advances have occurred at Buffalo and Cleveland. THE IRON AGE scrap composite price has advanced to $20.50 from $20.42 last week.

. . . PITTSBURGH . . .

. . . Bookings of finished steel decline; Pittsburgh operations slightly lower.

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. . . 9400 tons of seamless pipe placed for Louisiana pipe line.

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. . . Change in wire selling terms expected; steel scrap is 75c. a ton higher.

PITTSBURGH, Aug. 10.—Although total bookings of finished steel products so far this month are off somewhat from the corresponding July period, producers continue optimistic over prospects for a good fall business. Bookings of practically all steel items except pipe have declined the past week from the previous period, although it is confidently expected that a substantial pick-up in orders from the automotive industry will materialize within the next two weeks or so.

Steel ingot production in the Pittsburgh district has declined one point to 83 per cent of capacity, while the Wheeling district remains unchanged at 95 per cent.

Strip steel production is off some owing to lighter order books, but tin plate operations are unchanged at 100 per cent with tremendous pressure for shipments exerted by consumers.

The pipe market has received impetus with the placing of 9400 tons of 6 and 8-in. seamless tubing by Standard Oil Co. of Louisiana for a 150-mile pipe line in the Louisiana fields. A large part of the order will be made in this district.

With the difference in selling practices for galvanized sheets eliminated between the North and the South, it is logical to expect some similar action soon on merchant wire products where a difference still exists.

Raw material markets are comparatively quiet with the exception of No. 1 heavy melting steel, which has advanced 75c. a ton over last week's average price.

Pig Iron

New business is spotty and consists of odd lot buying. Consumers are showing no anxiety concerning fourth quarter prices even though a continuation of the upward movement in scrap prices might suggest an advance. The consensus of opinion is that no advance in pig iron prices will come, but no producers have definitely stated their intention. A local steel stack has blown out for relining.

Semi-Finished Steel

Bookings receded somewhat in the past week and activity is not as pronounced as a few weeks ago. This condition is only temporary as most producers look for heavier buying within a month, with foreign inquiry exerting its influence. A shortage of supplies this fall is not a remote possibility if present estimates of increased business materialize.

Bolts, Nuts and Rivets

New buying continues slow and practically all backlogs have been cleaned up. Heavier production must await an increase in automotive buying and a further decline in customers' inventories.

Bars

Bar tonnages so far this month are in less volume than were booked in the corresponding July period. Backlogs are fairly well cleaned up, with mills able to promise reasonably prompt delivery. No noticeable change in the rate of incoming business is expected much before the end of this month, when automotive orders will probably show considerable improvement.

Cold Finished Bars

New business continues at low ebb and producers do not look for a pick-up of any consequence before the latter part of this month. Fairly prompt shipment is being given on most sizes and grades. The reaffirmation of present prices has tended to slow up incoming orders, there being no incentive for forward commitments.

Reinforcing Bars

Although awards in the past week were not numerous, two of them involved fair-sized tonnages. A sewer project at Brooklyn will require 3500 tons of bars to be finished by Igoe Brothers. Virginia Steel Co. will finish 1000 tons of bars for a factory building at Richmond, Va.

Steel Sheet Piling

Current demand is dull. The only award of any consequence was 416 tons of piling for the Tennessee Valley Authority to be furnished by Carnegie-Illinois Steel Corp. Bids on the Mare Island, Cal., coffer-dam for the Government requiring close to 10,000 tons of piling will be tabulated soon.

Plates and Shapes

The volume of structural inquiries and awards in the past week was on a par with recent activity. The American Bridge Co. was awarded contract WB-4 involving 2100 tons of material for the Bronx-Whitestone bridge, New York. Structural plate and shape specifications declined somewhat this week compared with the previous period and backlogs have been correspondingly decreased.

Sheets

Aggregate sheet specifications declined again during the past week, although the falling off was not marked. Producers expect a better flow of business from automobile companies within the coming week or two. Meanwhile galvanized sheet specifications have picked up some following the announcement of the new selling practices to take place Oct. 1, which reflect net increases, although the base price remains unchanged. Allowances to bona fide roofing manufacturers will be made on flat galvanized sheets.

Tubular Goods

Standard Oil Co. of Louisiana has ordered approximately 9400 tons of 6 and 8-in. seamless tubing for a 150-mile pipe line leading from a point in Louisiana fields to its Baton Rouge refinery. A sub

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Aug. 10, 1937	Aug. 3, 1937	July 13, 1937	Aug. 11, 1936
Rails, heavy, at mill	$42.50	$42.50	$42.50	$36.37½
Light rails, Pittsburgh	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh	37.00	37.00	37.00	30.00
Sheet bars, Pittsburgh	37.00	37.00	37.00	30.00
Slabs, Pittsburgh	37.00	37.00	37.00	30.00
Forging billets, Pittsburgh	43.00	43.00	43.00	37.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.45	2.45	2.45	1.95
Bars, Chicago	2.50	2.50	2.50	2.00
Bars, Cleveland	2.50	2.50	2.50	2.00
Bars, New York	2.78	2.78	2.78	2.30
Plates, Pittsburgh	2.25	2.25	2.25	1.90
Plates, Chicago	2.30	2.30	2.30	1.95
Plates, New York	2.53	2.53	2.53	2.19
Structural shapes, Pittsburgh	2.25	2.25	2.25	1.90
Structural shapes, Chicago	2.30	2.30	2.30	1.95
Structural shapes, New York	2.5025	2.5025	2.5025	2.16¼
Cold-finished bars, Pittsburgh	2.90	2.90	2.90	2.25
Hot-rolled strips, Pittsburgh	2.40	2.40	2.40	1.95
Cold-rolled strips, Pittsburgh	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	3.15	3.15	3.15	2.50
Hot-rolled annealed sheets, No. 24, Gary	3.25	3.25	3.25	2.60
Sheets, galv., No. 24, P'gh	3.80	3.80	3.80	3.20
Sheets, galv., No. 24, Gary	3.90	3.90	3.90	3.30
Hot-rolled sheets, No. 10, Pittsburgh	2.40	2.40	2.40	1.95
Hot-rolled sheets, No. 10, Gary	2.50	2.50	2.50	2.05
Cold-rolled sheets, No. 20, Pittsburgh	3.55	3.55	3.55	3.05
Cold-rolled sheets, No. 20, Gary	3.65	3.65	3.65	3.15
Wire nails, Pittsburgh	2.75	2.75	2.75	2.10
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.15
Plain wire, Pittsburgh	2.90	2.90	2.90	2.40
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.45
Barbed wire, galv., Pittsburgh	3.40	3.40	3.40	2.60
Barbed wire, galv., Chicago dist. mill	3.45	3.45	3.45	2.65
Tin plate, 100-lb. box, P'gh	$5.35	$5.35	$5.35	$5.25

Pig Iron

Per Gross Ton:	Aug. 10, 1937	Aug. 3, 1937	July 13, 1937	Aug. 11, 1936
No. 2 fdy., Philadelphia	$25.76	$25.76	$25.76	$21.3132
No. 2, Valley furnace	24.00	24.00	24.00	19.50
No. 2, Southern Cin'ti	23.69	23.69	23.69	19.44
No. 2, Birmingham†	20.38	20.38	20.38	15.88
No. 2, foundry, Chicago*	24.00	24.00	24.00	19.50
Basic, del'd eastern Pa.	25.26	25.26	25.26	20.8132
Basic, Valley furnace	23.50	23.50	23.50	19.00
Malleable, Chicago*	24.00	24.00	24.00	19.50
Malleable, Valley	24.00	24.00	24.00	19.50
L. S. charcoal, Chicago	30.04	30.04	30.04	25.2528
Ferromanganese, seab'd, carlots	102.50	102.50	102.50	75.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.
*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$22.00	$21.25	$19.50	$15.75
Heavy melting steel, Phila.	19.75	19.75	19.25	14.00
Heavy melting steel, Ch'go	19.75	20.25	16.75	15.00
Carwheels, Chicago	19.75	19.75	18.25	15.00
Carwheels, Philadelphia	20.75	19.75	19.75	15.25
No. 1 cast, Pittsburgh	20.25	20.25	19.25	14.75
No. 1 cast, Philadelphia	21.25	20.75	20.25	15.25
No. 1 cast, Ch'go (net ton)	16.75	16.75	15.25	13.50
No. 1 RR. wrot., Phila.	19.75	19.75	19.75	14.75
No. 1 RR. wrot., Ch'go (net)	19.75	19.75	15.50	13.75

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.35	$4.35	$4.35	$3.65
Foundry coke, prompt	5.00	5.00	5.00	4.00

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	14.00	14.00	14.00	9.75
Lake copper, New York	14.12½	14.12½	14.12½	9.87½
Tin (Straits), New York	60.125	58.875	60.00	43.25
Zinc, East St. Louis	7.25	7.00	7.00	4.80
Zinc, New York	7.60	7.35	7.35	5.17½
Lead, St. Louis	6.35	5.85	5.85	4.45
Lead, New York	6.50	6.00	6.00	4.60
Antimony (Asiatic), N. Y.	15.375	15.375	14.75	12.50

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Aug. 10, 1937	2.605c. a Lb.	$23.25 a Gross Ton	$20.50 a Gross Ton
One week ago	2.605c.	23.25	20.42
One month ago	2.605c.	23.25	18.50
One year ago	2.159c.	18.84	14.92

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1937	2.605c., Mar. 9	2.330c., Mar. 2	$23.25, Mar. 9	$20.25, Feb. 16	$21.92, Mar. 30	$17.08, June 15
1936	2.330c., Dec. 28	2.084c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., April 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.403c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

stantial part of the order will be fabricated in this district. Shell Pipe Line Corp. will build a 250-mile, 8-in. pipe line from Roxana, Ill., to Indianapolis. Oil-country goods specifications continue to flow in freely and mills have been unable to make much headway on backlogs. The demand for other tubular items is still slow.

Wire Products

With the difference in galvanized sheet selling practices between Northern and Southern areas eliminated, it is expected that some similar action will be forthcoming soon with regard to the sale of merchant wire products. The latter items are handled differently in the two areas, a quantity deduction set-up being part of the Southern practice. Total wire sales during the past week show practically no change from the previous period. Foreign inquiry for barbed wire in the past week or two included 4000 tons for China and 5000 tons for Japan.

Tin Plate

Producers are under persistent pressure from can makers for more prompt delivery. Despite the fact that shipments are especially heavy, some can companies are not only cutting up all material being received but are dipping heavily into inventories. Meanwhile production continues at approximately 100 per cent, and it is a foregone conclusion that steel companies whose plants were closed by strikes will not be able to complete shipments at present quotations by Oct. 1. Follansbee Brothers Co., Pittsburgh, has advanced the price of heavy coated roofing terne plate 50c. a package. As yet other mills have not indicated their course.

Strip

Hot and cold rolled strip business is only fair, and greater activity is not expected until automotive purchases become larger and seasonal influences in other consuming lines have subsided. There is little doubt that the reaffirmation of steel prices has caused some customers to defer their purchases. Nevertheless producers confidently expect a good fall business.

Coal and Coke

Demand for beehive furnace coke was off slightly last week owing to a short hold-up in shipments to a Valley furnace, which was down a few days because of labor disturbances. One coke plant, having 200 or more ovens, is expected to resume operations within the near future following the resumption of a blast furnace in the Buffalo region. The future trend of the beehive coke market will be largely dependent upon the number of blast furnaces taken out for relining, but operators in the past have been able to gage beehive coke production fairly well to demand. In some quarters it is believed that a substantial pick-up in business will materialize within the next month or so.

Peoria & Pekin Union has placed an order for 25 hopper cars with General American Transportation Corp. Pressed Steel Car Co. was awarded 25 instead of 50, as reported last week.

Union Pacific is inquiring for 50 box cars.

New York, New Haven & Hartford has asked for authority to issue $1,600,000 in three per cent equipment trust certificates for part payment of 50 light weight steel passenger coaches and five steel cafeteria coaches to be purchased from Pullman-Standard Car Mfg. Co.

. . . Stove production slows down; farm implement plants at capacity.

ST. LOUIS, Aug. 10.—A fair amount of business is being transacted in finished steel, a slight summer falling off being experienced, although not so pronounced as sometimes prevails. Sheets have been in fair demand, with stress being laid on deliveries. Stove manufacturers in the district have slowed down some, due it is said to some labor unrest plus cancellations by mail order houses. Highway projects in Oklahoma are the center of interest in structural projects in this section. Missouri will award 220 tons for two bridges for which bids have just been opened.

Buying of pig iron is quiet. The melt is said to be off, and melters seem to feel that the present prices will be reaffirmed when the books open for the fourth quarter on Sept. 1. If there are indications of an increase in price, there may be considerable buying this month. Stove foundries are slowing up, and the jobbing foundries report a slackening of buying. The brightest spot in the territory is in the agricultural implement plants in the Tri-cities, and in Peoria, which are operating at full capacity and with the outlook good for a continuation of this rate.

. . . Market in a seasonal lull; prospects good.

SAN FRANCISCO, Aug. 9.—Seasonally quiet summer sales and manufacturing operations continue on the Pacific Coast, with an increasing number of major projects in the immediate offing. Definite calls for bids within the next two weeks include 3000 tons of bars and shapes.

Although there is some competitive variation in quotations for reinforcing steel bars, the market for structural shapes, plates and cast iron pipe is firm.

Scrap metal demand has entirely subsided with the withdrawal of Japaneses buyers from the market because of extremely unfavorable exchange rates. Whereas feverish trans-Pacific buyers bought for as high as $22.50 per ton in the extreme demand several months ago, current quotation is $9.50 for melting scrap f. o. b. Pittsburg or South City mills of the only two Pacific Coast buyers.

What appeared at first to be an extreme variation in bids for 6575 tons of round and square bars for the U. S. Engineers' Office at Los Angeles last week has been reduced to a range of approximately $25,000, less than 10 per cent of the $375,000 project. The Sheffield Steel Corp.'s bid of $277,657 was f. o. b. Kansas City, whereas the next low bidder, Soule Steel Co., bid $354,869 f. o. b. project in southern California. There were four other bidders on the complete quanity, the highest being the Blue Diamond Corp. at $378,844. It is expected that awards will be made this week.

The Seattle Board of Public Works has definitely awarded contract for the concrete arch Ruby Dam across the Skagit River to the General Construction Co., Seattle; the Columbia Construction Co., Bonneville, Ore. and J. F. Shea Co., Portland, Ore., joint bidders for $3,967,785. The project involves 300 tons of shapes and 150 tons of bars.

The California State Highway Commission has announced that $750,000 will be expended early in the fall for the elimination of five dangerous railroad crossings by underpasses and overpasses.

. . . . CHICAGO . . . .

. . . Operations rise to 85½ per cent; July business volume slightly upward.

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. . . Orders are still smaller than shipments, and backlogs are decreasing.

o o o

. . . 8000 to 10,000 freight cars may be bought; steel scrap in excess supply drops 50c.

CHICAGO, Aug. 10.—Ingot output has increased one-half point to 85½ per cent of capacity this week, reflecting a slight operating rise at two mills, and a continuation of last week's figures elsewhere.

Sales and specifications are fairly close to the average of the past several weeks, with some mills reporting downward variations, and others compensating trends in the opposite direction. All in all, the July movement was upward, which is significant not because of the tonnage involved, but because the normal July tendency is a decline rather than an increase in activity. Orders are still far behind shipments, however, and backlogs in general are decreasing.

Orders and releases are general in character, with agricultural machinery makers perhaps still in the lead as far as tonnage is concerned, and showing no signs of a greatly diminished rate of operations. Other industries, too, are beginning to show signs of life. Sheet orders for initial runs of 10,000 to 25,000 cars have been reported from automobile companies, with sellers expecting the last of August to inaugurate the major purchasing period for 1938 models.

It was heard here this week that 3000 to 4000 cars would be bought by one western railroad, 2000 to 3000 by another and several thousand additional by some other railroads, totaling 8000 to 10,000 cars. The next 30 days is expected to bring out some of these programs.

The price of No. 1 steel has been lowered to $19.50 to $20 this week as the result of an excess supply of material that has flowed into this center, and caused a reduction in brokers' bids.

Pig Iron

Shipments are increasing from week to week both in pig iron and foundry coke, one seller reporting shipments of the latter 20 per cent ahead of July. Much larger movements in each are expected late this month or early in September, when the automotive industry gets production fully under way on 1938 cars. Car wheel and railroad foundries are still active on old orders, and, if the car buying expected in the fall is actually consummated, production will likely be increased. Considerable discussion of a price rise is being heard, but it is believed there is little likelihood of such a move with steel prices reaffirmed for the last quarter, unless scrap rises much higher than it is now being quoted.

Plates

Demand for plates is slowing down and backlogs are declining. Deliveries range from five to 10 weeks, depending on the mill. Tank makers and structural fabricators are providing most of the business, since the railroads have not yet begun their fall buying and repairing program. Within the next 30 days a considerable amount of car buying from Western roads may be expected, amounting possibly to 8000 to 10,000 cars, according to reliable sources here. Fully half of these will be accounted for by two roads, while the remainder will be divided among several. About 15,000 tons of skelp will be needed for a Shell Oil Corp. 250-mile, 8-in. pipe line.

Sheets

Some buying by automobile manufacturers for first runs of 10,000 to 25,000 cars has been reported here, and large scale purchasing is looked for within a few weeks, possibly by the end of this month. Deliveries of cold rolled sheets are listed at about four to five weeks, while hot rolled require considerably longer, October being quoted in most instances. Some farm equipment orders have been received.

Bars

With little business coming in yet from the automobile trade, most of the bar specifications are still emanating from the agricultural machinery makers. Deliveries require from 30 to 60 days, but will probably become further extended during the fall.

Wire and Wire Products

Orders in the first nine days of August were considerably in excess of those received during the same period in July, the new business being considered a forerunner of the fall buying season. Orders and specifications have not yet been received for 1938 automobile models, but demand from the makers of tractors and farm implements is unabated. Deliveries are fairly prompt in the wire line, and shipments of manufacturers' wire, merchant products, electrical and wire rope, and construction wire are being made within two or three weeks.

Structural Shapes

No awards of any importance have been reported this week and inquiries are likewise scarce, only two being of sufficient size to mention, one of 700 tons for fishway gates for a dam in Oregon, and the other of 550 tons for a bank building in Nashville, Tenn. Even jobs of less than 100 tons are infrequent, and structural fabricators generally are far from rushed.

Reinforcing Steel

With the exception of a 950-ton award for a distillery in Peoria, which went to Bethlehem Steel Co., little activity has been reported here in the last week. In Kansas City a new court house will take about 1000 tons of bars, and a General Foods storage elevator in Kankakee will require about 200 tons in addition to the manufacturing building there for the same company which was previously re-

ported. Although there is a marked absence of large projects, some sellers report a sufficient number of small jobs to keep them fairly well occupied.

Warehouse Business

Demand for warehouse steel is being well maintained, business the last week in July about equaling the previous seven-day period, which was in excess of the week before, so that the upward move has not been checked. City buying, although much better than last year, is running behind when compared with the purchases from the country regions. The latter is expected to increase considerably in the fall, when this year's bumper crops are marketed and farmers' incomes increase. A slight sheet shortage still is being felt, but this situation should be remedied in a short time. Stocks generally are in good condition.

Shell Pipe Line Corp., Shell Building, St. Louis, a subsidiary of Shell Petroleum Corp., same address, plans new 8-in. welded steel pipe line from oil refinery of last noted company at Roxana, Ill., to Indianapolis, about 250 miles, for gasoline transmission. Bulk storage and distributing terminal will be established at latter place. Pumping stations for booster service will be built along route. Cost close to $3,000,000. Company also is considering branch welded steel pipe line, same size, from oil field now being developed in southern part of Illinois, connecting with new pipe line noted.

Standard Oil of Louisiana, Baton Rouge, has awarded contract for 9400 tons of 6 and 8-in. seamless tubing for 150-mile pipe line from a point in Louisiana to company's Baton Rouge refinery. The order was divided among four or more companies, two of which were Jones & Laughlin Steel Corp. and National Tube Co., Pittsburgh.

Champion Paper & Fibre Co., Houston Division, Pasadena, Tex., plans 30-in. welded steel pipe line from Magnolia Gardens district, near Houston, under Houston ship channel to Pasadena, about 800 ft. in all, for water supply for new paper mill at last-noted place. Line will be laid in a concrete tunnel, 8 x 10 ft., 30 ft. below ship channel. Entire project will cost close to $2,000,000. Howe & Wise, Houston, are consulting engineers. Main offices of company are at Hamilton, Ohio.

United Gas Co., Rusk Building, Houston, Tex., has let contract to Phoenix Engineering Corp., same address, for about seven miles of welded steel pipe in Military Road, Covington, La., for natural gas transmission.

Texas-New Mexico Pipe Line Co., Hobbs, N. M., plans about 40 miles of 12-in. welded steel pipe in section of Lea County, N. M., for crude oil transmission. Cost over $250,000 including pumping stations for booster service.

Tombstone, Ariz., plans pipe lines for municipal natural gas distribution. Fund of $42,000 is being arranged, of which $17,000 will be a municipal bond issue and remainder through Federal aid. A control station for distribution is included in project.

Tucson Gas, Electric Light & Power Co., Tucson, Ariz., has authorized welded steel pipe line from Park Avenue, Tucson, to Desert Sanitarium and vicinity, about five and one-half miles, for natural gas transmission. C. H. Webber is superintendent.

Supervising Construction Engineer, Indian Service, Billings, Mont., asks bids until Aug. 16 for mild steel pipe; also for wrought iron pipe and fittings, for Rapid City, S. D.

. . . *Pig iron buying by Japan expected next month.*

BOSTON, Aug. 10. — Little pig iron was bought the past week, and negotiations between domestic furnaces and European countries were dropped temporarily. The outlook for business, however, is quite bright. Foundries will buy a large aggregate tonnage just as soon as the price situation is a little clearer, and it is intimated Japan will again place large tonnages next month. With operating costs higher, in some instances more than $2.50 a ton, the pig iron price outlook is decidedly strong.

Small buying of reinforcing steel bars is quite active and a potential round lot business is in the making now that fourth quarter prices have been established. The outlook for steel fabricators also is brighter. The three large local fabricators still refuse to sign a contract with the CIO. A movement is on foot among AFofL blast furnace operatives to form an independent union.

. . . *Activity still at high point; July shipments of tees largest in seven years.*

LONDON, Aug. 9 (*By Cable*).— Tremendous activity in the British iron and steel industry continues, July tees shipments having been the heaviest for fully seven years.

Cleveland pig iron output is still inadequate and business is being turned away. The hematite stringency, however, is less acute and East Coast makers are now able to allocate 1000 tons weekly for export.

Conditions in Scotland are becoming more normal after the recent holidays and West Scottish sheet mills have booked large Government orders. John Summers & Son, Ltd., plans to install a modern hot and cold strip mill.

The Continental steel market is calm, though more active than the normal summer season. Business from Japan has improved, particularly in large rounds and shapes. Delays in delivery have now shrunk to between three and three and a half months for all products.

Belgian steel workers have received wage increases of two and a half per cent beginning Aug. 15. The French Government has authorized substantial advances in French home prices on all kinds of iron and steel products. Belgian pig iron export prices have been reduced and No. 3 foundry is now £5 15s., paper, and basic is £5 12s. 6d., paper, both f.o.b., Antwerp.

The International Wire Rod cartel has again been provisionally prolonged until the end of August.

Japan Acquiring Foreign Iron Mines

LONDON *(Special Correspondence)*.—During the past few months Japan has been extremely active in the acquisition of iron ore properties in the British Empire and the Dutch possessions in the East. It has been difficult for her to acquire the necessary tonnages of iron ore from her pig iron production and scrap for steel manufacture from abroad. She suffers from a serious deficiency of domestic supplies of high grade iron ore.

In an effort to assure herself of adequate supplies of iron ore, Japan has recently acquired mines in Malaya, the Dutch East Indies, Western Australia and Canada. Her latest acquisition is the Iron Duke on the Louise Islands of the Queen Charlotte group, British Columbia. The property consists of nine Crown-granted mineral claims, and picked samples of the ore obtained there contain as much as 70 per cent of iron. It has not yet been possible to indicate the probable average grade of the ore, however.

With the assistance of State subsidies, Japan is now building a fleet of iron ore carriers to transport ore from Australia and the Dutch East Indies.

. . PHILADELPHIA . .

. . . August business continues to drag bottom.

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. . . Operating rate of district down to 70 per cent.

o o o

. . . Scrap market is strong, but No. 1 steel remains at $20.

PHILADELPHIA, Aug. 10. — District sales offices have yet to see the end of the mid-summer lull in buying. New business placed so far this month is lighter than in any similar period in 1937, and no marked upturn is anticipated before the end of the month. There is no outstanding activity in any line, and the small tonnages being placed are from miscellaneous sources. Mill backlogs have been reduced much below those of a month ago, with the exception of one plate mill. Deliveries on most materials are now quite prompt, about three to four weeks.

Pencoyd dropped one furnace this week, and Alan Wood has an open hearth down for roof repair for a few days, bringing the district operating rate down a point to 70 per cent. The indications are, however, that the rate should take a sharp rise next week, as it is understood that Bethlehem has lit six additional open hearths at Sparrows Point for early operation. Merchant blast furnaces continue operations at a high rate and are shipping all the iron they make, while foundries continue to operate on a five-day basis.

The local scrap market is still very strong, and there seems to be a real shortage of material. Most grades have been advanced 50c. to $1, although No. 1 steel is still quotable at $19.50 to $20.

Plates

Following the lead of the Inland Steel Co. at Chicago last week, both the Central Iron and Steel Co., Harrisburg, and the Alan Wood Steel Co., Conshohocken, Pa., have reduced the price of floor plates $6 a ton, effective at once, but the latter reserves the right to change the price without notice. The district price is now $3.60 per 100 lb. f.o.b., in place of $3.90. Business in floor plates, meanwhile, remains spotty. New business in plates, both sheared and universal, continues light, being from miscellaneous sources, chiefly fabricators of tanks and boilers. One of the Eastern Pennsylvania mills reports, however, a larger backlog than at the corresponding date in July. Deliveries are near normal, averaging three to four weeks, except on very wide plates.

Sheets and Strip

Practically no change is noted in the sheet market in recent weeks. New business remains light, in the absence of any strong movement in automotive buying. Delivery promises on cold rolled material now average four weeks or less. The situation in strip is not much different, and no real upturn is looked for before the end of the month.

Shapes and Bars

Structural lettings of the past week were very light. Scranton fabricators figured in the only two awards of the district, one a bridge of 120 tons at Scranton, the other a dormitory building, taking 550 tons, at the State College. The only sizable new project is the Trenton plant of the Ternstedt Mfg. Division of General Motors, calling for over 4000 tons, for which bids are due in Detroit on Wednesday. Reinforcing bar lettings continue in small tonnages.

Pig Iron

Orders in the nature of a few hundred tons for September delivery have been reported. Furnaces are shipping every pound of iron they make and in more than one instance stocks of certain special analyses are down to the vanishing point. Local foundry stocks, on the other hand, appear to be ample. Foundries have eaten heavily into their own order backlogs, but continue to operate on a five-day week. New fall business is beginning to trickle into the jobbing foundries, and will tend to sustain present operations. District selling agents are still talking of a $1 a ton increase for the fourth quarter.

Imports

The following iron and steel imports were received here during the week: 10 tons of ferrochrome from Japan; 1156 tons of pig iron from British India; 19 tons of steel tubes, 31 tons of steel forgings, and 8 tons of steel bars from Sweden.

Technicolor to Film U. S. Steel Plants

CRANEMEN, millhands, miners and seamen will become screen actors Aug. 14 when U. S. Steel Corp. pioneers the use of color photography in industrial educational feature films. The film, costing more than $200,000, will be made by Technicolor, Inc. The "shots" will constitute the first commercial feature in color. Introduction of this medium, combined with sound, will bring the screen presentation of steel production to a new high in realism.

An eight weeks' film itinerary has been planned, starting at Hibbing, Minn., and winding up at Pittsburgh. At Hibbing, miners will be filmed as they unearth the raw ore, and in nearby Duluth, seamen and loaders will be "shot" on the ore docks and decks of whaleback lake boats.

Stopping next at Gary, Ind., the caravan will film blast furnaces, coke works, open hearth furnaces, and rolling mills in action. The large Gary rail mill also will be featured. The photographers go to Waukegan, Ill., to shoot wire drawing and rod production operations. Pictures also will be made of the manufacture of fence, nails, and other wire products.

The National Tube Co.'s pipe and tube operations at Lorain, Ohio, will be photographed, and then the movie troupe goes to Pittsburgh where the Homestead mills will be "taken" as they roll out the hot metal. McKeesport, Pa., also will be visited in order to catch a Bessemer converter in operation.

Three reels of color film are to be made, supplemented by six of black and white. In order to catch the various phases of operation in color, portable lighting equipment

capable of furnishing street illumination to a city of 100,000 population will be employed by the film company.

Chinese Steel Industry Developing

ALTHOUGH iron ore mining and smelting is stated to have been conducted in China as early as 2500 years ago, a comparative lack of industrial enterprise has blocked all efforts to improve her position as a relatively minor producer of steel. Lately, however, the Chinese National Government has shown a decided interest in the local iron and steel industry, according to the current issue of the *Iron and Steel Fortnightly*, published by the Department of Commerce.

Until the later years of the last century, the 170,000 tons of iron produced annually in crude native furnaces was sufficient to satisfy Chinese needs. Since that time the annual import trade has grown steadily, and in 1936, imports, exclusive of serap, were in excess of 500,000 tons.

Iron ores in China, the report says, are widely distributed, and for the most part consist of "limonites and hematites occurring in carboniferous shales and sandstones, as nodules, usually varying from a few pounds to a few hundred pounds in weight, though masses of several tons are said to have been found. Records show that iron ore output was 1232 metric tons in the year 806, and grew to 433,843 tons in 1928. However, by 1936 the industry had developed to the point where exports aggregated 1,307,700 tons, most of it going to Japan.

In 1936 the Chinese listed 15 active blast furnaces with an annual potential capacity of 968,000 tons, and four active steel mills. Another mill with four open-hearth furnaces having a combined daily capacity of 1200 tons is undergoing renovations that will enable it to be placed in operation soon. Plans for four other plants are under consideration. The inadequate production of Chinese blast furnaces necessitates importing the bulk of the pig iron used by these mills and the rapidly expanding foundry industry. Russia is the chief source at present.

"It is expected," the report concludes, "that the close of 1937 will see a shortage of numerous iron and steel items in Chinese markets because of the inability of exporting countries to fill orders. This should serve as a further impetus to the local producing industry."

Industrial Machinery Exports Climb

EXPORTS of industrial machinery from the United States during June were valued at $21,128,496, a gain of 66 per cent over the corresponding shipments in June, 1936, valued at $12,675,659, according to the Machinery Division, Bureau of Foreign and Domestic Commerce. The upward trend in these exports has continued steadily, the first six months' shipments abroad aggregating $117,247,041, an increase of 39 per cent over the $84,279,326 worth exported during the corresponding period of last year.

Overseas consignments of power-generating machinery, except electric and automotive, were valued at $1,067,787 in June of this year, a gain of 63 per cent over the June, 1936, shipments valued at $654,773. The outstanding increases were in sales of locomotives and parts, steam boilers, and diesel engines.

Exports of conveying and construction machinery led the advance during June, increasing to $2,151,078, approximately double the June, 1936, shipments valued at $1,076,668. Increases were registered in most classes of this group, but especially in excavators and parts valued at $587,781 compared with $207,997 a year ago, dredging machinery $258,461 against $76,566, and other road-making equipment parts valued at $366,972 against $151,769 in June of last year.

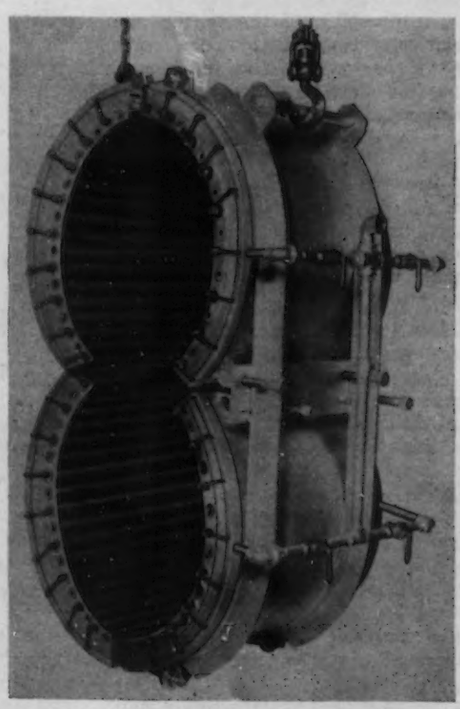
Foreign sales of mining, well and pumping machinery were valued at $4,574,390 during June, a gain of 81 per cent over the shipments in June, 1936. Exports increase in most classes of this group, the most notable being in petroleum and gas well-drilling apparatus which advanced to $1,334,636, compared with $723,811 in June last year, and other petroleum well and refining machinery to $1,174,593 against $552,201 a year ago. Rock drills advanced to $202,047 from $135,540, and ore-crushing machinery to $356,166 compared with $133,375 a year ago, it was stated.

June exports of power-driven metal - working machinery amounted to $4,731,173, a gain of 95 per cent over the June, 1936, exports valued at $2,431,944. Increases were recorded in all classes of "Other Industrial Machinery," the total foreign sales in this group amounting to $5,250,401, 60 per cent greater than the $3,285,469 worth exported during June, 1936.

Rolls Heated by Radiatube Jacket

THIS roll jacket, recently developed by the C. M. Kemp Mfg. Co., brings to the preheating of hot mill rolls a highly efficient radiant heat application, the use of which is becoming prevalent for a variety of heating operations.

The Radiatube roll heater is designed to conform to the contour of the rolls being heated. All heat is transferred by radiation from the heat resisting tubes which are internally heated by specially designed burners supplied with complete air-gas mixture under positive pressure from a Kemp industrial carburetor. By using this method a high velocity flame, burning to complete combustion regardless of tube temperature, is secured. A multiplicity of tubes fired alternately from opposite ends provides adequate heat transfer surface to give high thermal efficiency. The unit is backed up with several inches of high grade insulation and mounted in a very heavy steel supporting frame with adjustments provided to fit the unit closely to the pair of rolls.



. . . CLEVELAND . . .

. . . Cleveland-Lorain operations down two points; Youngstown unchanged.

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. . . Backlogs continue to drop slowly.

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. . . Overstocked consumers are liquidating inventories.

CLEVELAND, Aug. 10.—The delivery at most mills here is increasingly unbalanced. Backlogs, on the average, continue to hold steady at eight to 10 weeks on products unaffected by seasonal consuming declines, such as light hot rolled annealed and galvanized sheets, etc. The lull in automobile specifications, however, has eased the situation considerably in cold rolled sheets and hot rolled pickled grades (22 gage and heavier) and some mills are willing to take on moderate tonnages for delivery within a week or so. This picture is scheduled to undergo a change over the next month, however.

Automobile companies are currently taking deliveries on moderate sheet and strip tonnage to clean up old models and have already entered heavy commitments for new models with deliveries spread out over the next six months. Additional orders are expected by the middle of September and pressure for deliveries and extension of backlogs will probably reach their maximum in late September and early October.

Some manufacturing industries dealing in consumer products, such as refrigerators and stoves, have over the past six months built up quite extensive stocks. This overbalanced condition has been considerably improved during July and so far in August, and steel makers confidently expect these companies back into the market in a substantial way some time in the fourth quarter.

Local demands for construction steel continue to be very poor. The wire makers, however, detect a slow recovery from the usual seasonal letdown and nail jobbers have succeeded in working off heavy stocks and again are active in the market.

Steel makers in this area are as one in their belief that the second half of 1937 will be more profitable than the first half. That is, if politicians in Washington do not sabotage the situation with additional destructive legislation. Perhaps the actual steel made in second half will not equal that in the first six months, but the orders now being rolled carry prices far better than those rolled during the first half.

Mill operations here are practically unaltered. Republic has dropped one open hearth for repairs, which is reflected in a temporary two-point drop in the Cleveland-Lorain rate to 81 per cent of capacity. Activities in the Valley are unchanged at an average rate of 85 per cent. There is every indication that the rates will stay close to these levels over the remainder of the third quarter.

The scrap situation in the Cleveland district remains quiet despite bullishness in other areas. Mills are well supplied with material and as yet have failed to enter the market to test the price structure. Quoted levels, however, have been raised another 50c. a ton in sympathy with higher levels established at brokers' yards and the very high price paid by one broker for items on the recent New York Central scrap list.

Pig Iron

This market continues to be utterly featureless, with all large melters avoiding new commitments until furnaces announce their fourth quarter price position on Sept. 1. Leading sellers are not of one accord with regard to possible price changes; at least one major producer looks for a rise if scrap prices continue their upward march, which action could conceivably pave the way for revisions in finished steel prices at the turn of the year. However, another important pig iron seller is insistent that there is nothing in the present picture to justify an increase in prices. Despite the lack of new demand here, which is essentially a reflection of the seasonal slump in automobile production, there has been no tendency for any user to delay shipments on old orders. In fact, one furnace reports July shipments far in excess of June deliveries, which trend has resulted in an inventory position far below normal.

Sheets and Strip

With automobile makers tapering off assemblies in preparation for the closing down of 1937 models, the demand for sheets and strip here is at low ebb. Although miscellaneous inquiries have latterly shown an improved trend, this activity is not in sufficient volume to halt the slow falling off of backlogs. Deliveries this week are about four or five days better than was the case a week ago, but there still are plenty of orders on books to keep mills operating close to capacity until early October. Jobbers here are most vocal in their dissatisfaction of the new price set-up on galvanized sheets and formed roofing. On the other hand, mills expect to clear their books of less-than-carload and mixed carload shipments, which type of business has always been an expense and a nuisance. This in turn will tend to throw much of this type of miscellaneous demand into the hands of jobbers, where it belongs, and the final result will be more satisfactory to mills and in the end probably as financially satisfactory to jobbers.

Shapes and Bars

Fabricators in this area handling small jobs are currently quite busy, but the turnover in large projects continues to be very sluggish. The only large award of the week went to Bethlehem Steel Co. and involved 325 tons of shapes for the Fisher Body Co. crane runway. Several attractive tonnages are still hanging fire, but the only new project which may soon engage estimators' attention is for an Oberlin, Ohio, auditorium, which may require about 1000 tons. L. A. Wells, local contractor, has announced the purchase of 315 tons of sheet steel piling from Bethlehem Steel Co. for a sewer project in Buffalo. Reinforcing bar activity is still extremely spotty and in very poor volume. Prices have lately received no real test, although there is little

doubt that an attractive tonnage would bring out a great variety of bids.

Wire Products

Sellers of wire and wire products continue to suffer from a seasonal letdown in demand, although new orders from miscellaneous sources are better than sellers had expected. Deliveries still are very extended on coarse wire for bolts, rivets, etc., but quick delivery is possible on various manufacturing wire items. These latter grades will enter their period of heavy demand early in September as the automobile industry swings back into full production. Demands for electrical wires and cables are being maintained at a very high level, and jobbers and users of nails have in general worked off very large inventories and are coming back into the market to replenish their stocks.

. . . *Heavy shipments are diminishing backlogs; outlook promising.*

BIRMINGHAM, Aug. 10. — Though backlogs are now being diminished, production and shipments are steady. Current bookings have been better than expected and these will be reinforced after the next several weeks by fall requirements, particularly from the farm markets. The outlook is now encouraging all the way to the end of the year and beyond.

Connors Steel Co. has booked 1510 tons of bars for the foundation of the new Charity Hospital at New Orleans.

Chicago Bridge & Iron Co. has been awarded a contract for a 300,000 gal. water tank at Clarksdale, Tenn.

The pavroll of the Gulfsteel division of the Republic Steel Corp. at Gadsden is now at the highest point in that division's history.

Open hearth production last week fluctuated, due to minor repairs at the Ensley and Fairfield plants of the Tennessee Coal, Iron & Railroad Co. Ensley operations ranged from three to four and Fairfield from five to seven. Republic's Gulfsteel division continued with all six. Next week 19 are scheduled, eight at Fairfield, five at Ensley and six at Gadsden.

. . . *Business quiet, but mill operations hold at high level.*

BUFFALO, Aug. 10.—The recent schedule of open-hearth operation is being maintained. Bethlehem's Lackawanna plant has 28 out of 30 in service; Republic, seven out of nine, and Wickwire-Spencer, two out of four.

There is some buying of pig iron in small lots.

Producers of finished material report conditions quiet, with few sizable jobs coming out in the construction field. The University of Buffalo gymnasium, originally reported to involve 250 tons of fabricated structural steel, will require 320 tons. The Buffalo Structural Steel Co. received the fabricating contract.

Both heavy and light material are affected in a slight falling-off of warehouse business, which shows no indication yet of the expected fall upturn.

. . . *Improving conditions are developing; mill backlogs still heavy.*

TORONTO, Aug. 10.—Improved conditions slowly but steadily are developing in the Canadian iron and steel markets and indications point to an active fall market. Officials of several steel companies have announced that backlogs will enable them to maintain almost capacity operations to the end of the year and earnings for 1937 are expected to reach a new high record. Steel mills are well supplied with orders both for domestic consumption and export. The automotive industry is showing indications of renewed activities, and it is stated that some concerns are sending out inquiries for materials for new models, which will be under way by the middle of next month. Building trades are showing increased activity and there has been a more active demand for structural steel recently. While business continues to be affected by the vacation season, possibilities for the fall are favorable.

In the pig iron markets sales are showing minor expansion due to new buying by the smaller melters, who have been running out of supplies. Sales for the week totaled approximately 1200 tons, of which approximately 700 tons was foundry iron.

Demand for both iron and steel scrap grades is fairly active. Mills are taking all the heavy melting steel offered by local dealers and also are taking delivery of turnings and others lines against contract. Automobile scrap is somewhat sluggish, with little call outside of shipments to the United States. While there has been increased offering of cast scrap lately, local dealers state that supplies still are not sufficient to take care of all demands.

. . . *Pig iron buying slow; sheet demand also light.*

CINCINNATI, Aug. 10. — Anticipated upturn in pig iron demand failed to materialize the past week, forcing the trade to move optimistic predictions forward another fortnight. Spot orders for immediate needs comprise the bulk of current demand as melters, handicapped by lack of assured steady business, refuse to build inventories too extensively. The foundry situation is still lacking in certainty because of the possibility of strikes or labor troubles among castings users. The new furnace of the Hamilton Coke & Iron Co. is not quite completed, but announcement is made that this new merchant iron stack will be blown in about Aug. 15.

Sheet steel ordering is still light. Current demand is about half of mill capacity. Inquiries, however, from widely scattered sources, as to fourth quarter deliveries sustain a strong market tone and bode well for year-end business. In addition, material held up for some time because of strikes in consumer areas is now being released. Production is being maintained in all units at top rates and backlogs are melting. Mill stocks on enameling and galvanized sheets are not plentiful and operators are hoping for space on rolling schedules to build depleted inventories.

. . . . NEW YORK. . . .

. . . No resumption of buying as yet for fall requirements.

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. . . Deliveries on most products continue to improve.

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. . . Municipal airport calls for 4350 tons of piling.

NEW YORK, Aug. 10.—There has been no evidence as yet of a marked resumption of steel buying for early fall requirements, although a moderate increase in orders for some products has been noticed. The aviation industry, though not a tonnage buyer, is one of the most active factors in the East and has been placing orders steadily for special steels. Alloy steel tonnage is also in better volume as plans are made for fall production of 1938 automobiles.

In most of the common grades of steel orders have not recovered in volume from their summer slump, though a few offices report a better volume in the first third of this month than in the corresponding period of July.

One of the largest inquiries for construction steel in this district is 4350 tons of sheet piling for Municipal Airport No. 2 at Long Island City.

With almost daily strike disorders occurring at Brooklyn ship repair yards, no new orders have been forthcoming from this source for many weeks. The Federal shipbuilding yard at Kearny, N. J., is free from labor strife, however, and is busy on Navy destroyers and oil tankers. In fact, the building activity seems to be limited only by the tonnage of plates that can be rolled for the boats by other Corporation subsidiaries. New plate business from refinery equipment makers is light.

Cold rolled sheets can be delivered as early as Aug. 28 by a leading sheet maker, with Sept. 18 the earliest promise on hot rolled annealed. New sheet business is from miscellaneous sources in light tonnages. Most galvanized sheet makers either have, or are preparing to follow the lead of the Tennessee Coal, Iron & Railroad Co. on the new price set-up. Some business has come in from jobbers to cover their immediate requirements before the $2 allowance is removed. A problem raised in this connection is how Government bids involving, for example, sheets, hand formed clips and rivets, will be handled in the future. Such bids must be lumped, and in the past this has been a simple matter for the jobber to do. Under the new set-up, the jobber lacks the incentive to bid on such work; yet the sheet mill is in no position to make a lump bid. Besides, splitting the order is likely to result in higher freight tariffs on l.c.l. shipments.

Pig Iron

There is little change in the volume of new business as compared with the past several weeks. Buying continues slow, consisting mainly of small lots for prompt delivery. Furnace shipments against old contracts are holding up fairly well. In some instances furnace stocks are slowly being replenished and will present a more generous supply of iron this fall than had generally been anticipated. Foundry melt, on the whole, is unchanged. Sporadic strikes in the auto field are being mirrored in the order books of auto supply foundries in this district, and a slight reduction in melting operations in the next few weeks will be the probable consequence. This will be balanced by the increasing activity of the heater and allied trades. A small tonnage of low phosphorus iron is included in the moderate amount of export inquiry currently circulating, and orders for tonnages ranging from 500 to 3000 tons have been reported.

REINFORCING STEEL

. . . Awards of 6635 tons —9815 tons in new projects.

AWARDS

Boston, 188 tons, city underpass, to Concrete Steel Co.

Norwich, Conn., 100 tons, State bridge, to Concrete Steel Co.

Bridgeport, Conn., 120 tons, St. Vincent's hospital addition, to Concrete Steel Co., New York, through E. E. Bray Co., Bridgeport, Conn.

Westchester County, N. Y., 200 tons, White Plains-Armonk highway project, to Concrete Steel Co., New York.

New York, 150 tons, bridge, Brook Avenue between East 134th and East 135th Streets, to Carroll-McCready, Inc., Brooklyn.

Brooklyn, 3500 tons, sewers, Flatbush Avenue and Avenue U, to Igoe Brothers, Newark, N. J.

Annandale, N. J., 114 tons, highway bridge, to Taylor-Davis, Philadelphia.

Erie, Pa., 375 tons, underpass to Truscon Steel Co., Youngstown, Ohio.

Elkins, W. Va., 160 tons, Randolph Avenue overhead, to Bethlehem Steel Co.

Detroit, 600 tons, J. L. Hudson Co. warehouse, to Bethlehem Steel Co.

Peoria, 950 tons, Hiram Walker Distillery, to Bethlehem Steel Co.

Sacramento, Cal., 177 tons, equipment and repair building, Army air base, to Truscon Steel Co.

NEW REINFORCING BAR PROJECTS

Cincinnati, 225 tons, National Cash Register Co. building.

Moraine City, Ohio, 400 tons, Frigidaire building.

Sandusky, Ohio, 400 tons, Pennsylvania Railroad dock.

Detroit, 100 tons, Baby Creek Sewer, breakwater gates and sewage regulation chambers.

Detroit, 3200 tons, Baby Creek Sewer, section No. 3.

Detroit, 2500 tons, sewage disposal system, primary sedimentation tanks.

Kankakee, Ill., 200 tons, General Foods elevator.

Kansas City, Mo., 1000 tons, court house.

State of Oregon, 280 tons, State highway bridges in Malheur and other counties; bids Aug. 12.

Soledad, Cal., 800 tons, Salinas River State highway bridge bids Aug. 25.

Olympia, Wash., 250 tons, State highway bridges; bids taken Aug. 10.

Boca, Cal., 117 tons, Truckee storage reservoir, Federal Bureau of Reclamation; bids taken Aug. 10.

Gila, Ariz., 101 tons, Bureau of Reclamation project; bids taken Aug. 5.

Imperial Valley, Cal., 143 tons, All American Canal; bids taken Aug. 9.

Monterey County, Cal., 100 tons, Mud Creek highway bridge; E. T. Lesure low bidder on general contract.

. . .NON-FERROUS. . .

. . . *Bullishness abroad may influence domestic copper price.*

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. . . *Lead advances twice to 6.50c., New York; zinc price split.*

o o o

. . . *Buying interest in tin unchanged as prices rise.*

NEW YORK, Aug. 10.—Accelerated copper buying in London, on an export basis of 14.75c. per lb., c.i.f., usual Continental base ports, together with growing domestic demands, has threatened to force an advance in domestic electrolytic quotations of 14c. per lb., Connecticut Valley. Although most producers favor maintaining the current price position, it is the general impression that an advance in quotations is inevitable. Sales of the red metal for the month, through Saturday, were 25,284 tons.

Lead

Consecutive advances of $5 per ton on Wednesday and Thursday raised the domestic price level to 6.50c. per lb., New York, the first price movement in four months. The new level has had no effect on the heavy buying of September positions that has developed during the past week, and which is estimated to be 50 per cent above the previous week's sales of 11,000 tons. Market interest is well distributed among the various trades. Lead buying in London, while not as strong as in other non-ferrous metals, has been in good volume at 5.18c. per lb., London, for prompt deliveries, and 5.24c. for future.

Zinc

The action of one custom smelter in raising its quotations Friday to a basis of 7.25c. per lb., East St. Louis, or 7.60c., New York, was followed by an announcement by another producer that it would continue to sell at the old price level of 7c. per lb., East St. Louis. In view of the fact that in the past consumers have frequently offered premiums for spot deliveries, together with the continued tight position of supplies, this advance should have no influence on consumption. Domestic slab zinc statistics for July show a slight decrease in stocks to 13,561 tons. Shipments totaling 49,701 tons were 518 tons under the June figure, and production dropped from 50,526 tons in June to 49,181 tons in July. Buying by London speculators on the basis of the metal scarcity in this country worked the export price up to 5.67c. per lb.

Tin

The advances in lead and zinc prices and the anticipated rise in copper have had a sympathetic effect on domestic tin prices, raising them to 60.375c. on Thursday, Friday and Monday. Straits metal declined slightly today to 60.125c. per lb., New York. Buying for consumption continues slow, but professional dealers are active in September positions. Lack of consumer activity in June and July is evidenced in the Commodity Exchange statistics, which show that deliveries for those months were respectively 1150 and 2140 tons under deliveries for similar months last year, although the cumulative deliveries for the seven months to date are 5275 tons above the same period in 1936. Fair buying in London the last few days has given the Exchange a firmer undertone. On first call in London this morning, standard quotations were £268 for prompt, and £266 10s future.

The Week's Prices. Cents Per Pound for Early Delivery

	Aug. 4	Aug. 5	Aug. 6	Aug. 7	Aug. 9	Aug. 10
Electrolytic copper, Conn.*	14.00	14.00	14.00	14.00	14.00	14.00
Lake copper, N. Y.	14.125	14.125	14.125	14.125	14.125	14.125
Straits tin, spot, New York	59.25	60.375	60.375	....	60.375	60.125
Zinc, East St. Louis.....	7.00	7.00	7.25	7.25	7.25	7.25
Zinc, New York	7.35	7.35	7.60	7.60	7.60	7.60
Lead, St. Louis	6.10	6.35	6.35	6.35	6.35	6.35
Lead, New York	6.25	6.50	6.50	6.50	6.50	6.50

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb., delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 15.375c. a lb., prompt, f.o.b., New York.
Quicksilver, $93.00 to $95.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 14.75c. a lb., less carload, delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	61.50c. to 62.50c.
Tin, bar	64.50c. to 65.50c.
Copper, Lake	15.00c. to 16.00c.
Copper, electrolytic	15.00c. to 16.00c.
Copper, castings	14.75c. to 15.75c.
*Copper sheets, hot-rolled	21.78c.
*High brass sheets.	19.75c.
*Seamless brass tubes	22.50c.
*Seamless copper tubes	22.625c.
*Brass rods	16.25c.
Zinc, slabs	8.25c. to 9.25c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	12.75c.
Lead, American pig.	7.50c. to 8.50c.
Lead, bar	8.50c. to 9.50c.
Lead, sheets, cut	10.00c.
Antimony, Asiatic	16.25c. to 16.75c.
Alum., virgin, 99 per cent plus	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, ½ and ½	35.00c. to 36.00c.
Babbitt metal, commercial grade	25.00c. to 65.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33⅓ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	64.50c.
Tin, bar	66.50c.
Copper, Lake	15.00c. to 15.25c.
Copper, electrolytic	15.00c. to 15.25c.
Copper, castings	14.75c. to 15.00c.
Zinc, slabs	8.75c. to 9.00c.
Lead, American pig.	7.00c. to 7.25c.
Lead, bar	10.50c. to 11.00c.
Antimony, Asiatic	17.88c.
Babbitt metal, medium grade	26.50c.
Babbitt metal, high grade	68.50c.
Solder, ½ and ½	40.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	10.875c.	11.625c.
Copper, hvy. and wire	10.25c.	10.75c.
Copper, light and bottoms	9.25c.	9.50c.
Brass, heavy	6.25c.	6.875c.
Brass, light	5.125c.	5.875c.
Hvy. machine composition	9.125c.	9.625c.
No. 1 yel. brass turnings	7.50c.	8.00c.
No. 1 red brass or compos. turnings	8.875c.	9.375c.
Lead, heavy	4.625c.	5.00c.
Cast aluminum	12.125c.	13.25c.
Sheet aluminum	13.25c.	14.75c.
Zinc	3.50c.	3.875c.

THIS WEEK'S MACHINE TOOL ACTIVITIES

. . . Summer vacation lull being experienced in nearly all markets.

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. . . Mass shutdowns in automobile industry and other plants curb new buying.

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. . . Business is in good volume for the season, however, and fall prospects are bright.

Detroit

IN the proposed new accessories plant of the Briggs Mfg. Co., machinery men see the only new prospects for the next few weeks, although they still anticipate the beginning of a new Plymouth buying program, plus some additional business for the new Dodge truck plant. For the most part, factory representatives and service men are having a difficult time speeding up deliveries and making installations in plants already shut down. Packard, Oldsmobile and Studebaker are the plants reported closed now. Ford, of course, has just reopened. This week, Cadillac-LaSalle, Lincoln and Nash are due to close. In the following week, many of the Chrysler group probably will close, as well as the rest of the General Motors divisions.

Cleveland

SELLERS of small tools and gages, here, are experiencing the best demand in their history with no indication of the usual summer slump. Users are particularly anxious to secure gage blocks and related precision equipment, and steel mills and various production plants are pressing for deliveries of electrical and automatic gaging and measuring devices. Shipments continue to lag at least two months behind orders, and no seller looks for an easing of this lag during the remainder of the year. The delivery situation for heavy tools is even worse, varying from 14 weeks up to five or six months for horizontal and vertical boring mills, planers, etc. New inquiry on the heavy equipment is sporadic and in poor volume at the moment, as is usually the case at this time of the year. With the return of the automobile and affiliated industries to peak production in the fall, the seller of heavy tools confidently expects inquiry to show a sharp recovery.

Cincinnati

VACATION periods in several of the district machine tool factories the past week prevented the gathering of complete information on the current market. From available data, however, there appears to be little change in machinery ordering. While a slackening in demand is noticeable, this is not so sharp as to indicate a general recession in buying. With shop forces reduced by vacations, production is about 40 to 50 per cent of capacity. Delivery on most machines is easier, although lathe builders, as result of present steady ordering, are still unable to promise quicker shipment.

Pittsburgh

IN most cases July business was off somewhat from the June volume. Some brokers reported greater activity in special machinery than in the general run of machine tools. Current inquiries are more or less normal in volume without the breakneck pace of earlier in the year. Orders are only fair, being received in about the same volume as in the corresponding July period. Most of the present lethargy is due to seasonal influences, and vacation schedules are still responsible for the absence of more brisk activity. Brokers are looking forward to a comparatively active fall, with a possibility of customers concentrating more on a program of replacement of wornout and antiquated machinery. Meanwhile, some deliveries are a little better but the improvement does not meet the desires of consumers. Lathes may be had sooner than was the case a month ago.

New York

AUGUST started off inauspiciously as far as new orders were concerned, most dealers and factory representatives reporting the smallest volume of orders and inquiries for any week this summer. Although there is still a substantial volume of proposals out, some of which will be closed soon, August is expected to be the low month of the year, largely because of the number of plant executives away on vacation. Western Electric at Kearny, N. J., which closed down for mass vacations the last two weeks of July, is the exception, and it is expected that orders will be placed on outstanding inquiries before the end of the month. Plant activity continues at a high level, but most equipment being purchased these days is for replacement rather than expansion. Carrier Engineering has acquired some machines in connection with its move to Syracuse, N. Y., but it is expected that the greater part of the equipment will be handled through Syracuse dealers, after the move is started around Sept. 1.

Export inquiries and orders are at a high level. English interests have made substantial purchases of American equipment, after being out of the market for over a month. Among recent English inquiries are calls for over 100 bench millers and bench lathes. The Russians are still making large commitments, and are expected to close on some heavy equipment inquiries in the near future.

Chicago

FROM reports received from machine tool sales offices here, it appears that the increased business long predicted for the coming fall season is on its way at last, and that from this point on the trend will be upward. July business in one office was estimated at 50 per cent greater than in June. Although orders and inquiries are mostly for lots of one to three machines, the recent volume of inquiries has risen considerably, and some sellers report lengthening deliveries already. The J. I. Case Co. has been buying for its Racine and Burlington plants, and Western Electric has been and will continue to be engaged in an extensive program of tool rehabilitation and replacement. It now seems fairly certain that Allis-Chalmers' new tractor motor plant will be located in Milwaukee, that only the motors will be built there and that the remainder of the tractor work will be farmed out. Last week the company announced plans to obtain $25,000,000 new capital for manufacturing expansion through the issuance of convertible debentures.

IRON AND STEEL SCRAP

. . . Market strong in East, particularly at Buffalo, but weakens at Chicago.

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. . . Composite up 8c. to $20.50.

AUG. 10.—The upswing started several weeks ago is being sustained by the high prices railroad steel is bringing. Some was sold into consumption at $24 at Pittsburgh and $22.50 at Buffalo. As a result, No. 1 steel is quotable at $21 to $21.50 at Buffalo, up $1.50 from last week as compared with a 75c. rise at Pittsburgh to a flat $22 and a 50c. loss at Chicago. At Philadelphia, No. 1 steel is firm at $19.50 to $20, but other grades have been marked up 50c. to $1. Balancing these factors THE IRON AGE composite figure rose 8c. to $20.50. At Chicago, a quick run-up in prices the past few weeks brought in a flood of material and weakness developed when mills refused to take the material at the then prices.

Export prices have been marked up at Boston and New York, although it is reliably reported that the Japanese have canceled recent orders for two to three boatloads.

Pittsburgh

With No. 1 heavy melting steel unobtainable at below $22 a ton and no sales into consumption at higher than this figure having yet been made, the market on No. 1 steel is quotable at $22 a ton flat. Quite a few brokers who sold recently at $21.50 a ton are paying this price for coverage and as high as $22 has been paid by some dealers. Railroad heavy melting steel quotations have moved up substantially on the basis of a sale into consumption at $24 a ton. In view of the unusual spread between No. 1 and railroad steel it is likely that further sales of the former will be at higher than present quotations. Railroad specialties have advanced $1 a ton following the closing of recent railroad lists. The market undertone continues strong and No. 1 steel is not too plentiful.

Chicago

A reluctance on the part of the mills to pay the present high prices has resulted in an overflow of scrap into this district from outlying points, which, in turn, has caused mills and brokers to ask for a halt on further incoming shipments. The market, for the time being, is weaker and No. 1 steel is being quoted at $19.50 to $20.00. This reduction, however, cannot be said to indicate a turning point in the recent swift rise of scrap prices, as continued high mill operations and strength in the East are factors which assure a strong market in this district. Brokers are able to buy No. 1 steel today from $19 to $19.50 and some railroad steel was sold last week for $19.75.

Philadelphia

The market continues strong, and nearly every item on the list has been marked up 50c. to $1 a ton, with the important exception of No. 1 heavy melting steel, which remains quotable at $19.50 to $20 on the basis of recent small tonnage sales into consumption. The gap between No. 1 and No. 2 steel has been reduced to $2, in place of $2.50 heretofore. While sales into consumption continue light, brokers are having difficulty in picking up even the small tonnages involved. Perhaps the most bullish sign pointer, however, was the sale of the Pennsylvania Railroad's July accumulations at $23.25 a ton, delivered at Weirton.

Cleveland

No. 1 steel on the New York Central monthly list was bid in by a broker at $22.50 for delivery into the Youngstown and Buffalo districts. Car wheels on the same list brought $21.50. Despite the confidence of this one broker in the future market, there is still no mill support in either the Youngstown or Cleveland areas to justify prices this high. Local mills are well supplied with scrap and are not expected to enter the market aggressively until early September. Brokers and dealers are attempting to build up yard stocks quietly, paying on the average near $20, but the flow of material is none too free.

Buffalo

Showing great strength, the market is advancing rapidly. A local mill paid $22.50 for strictly No. 1 steel in a railroad list last week. The same mill is offering $20 and $18 for No. 1 steel and No. 2 steel, respectively, from local dealers, but is not getting much tonnage. An unconfirmed report was that a local mill paid either $20.50 or $21 for 2000 tons of No. 1 steel. Dealers are offering $20.50 against a $21 purchase of No. 1 steel made the week before last at Depew. Another Buffalo mill continues to hold up shipments.

Boston

Scrap prices continue to advance on an increasing volume of business. Heavy melting steel for Pennsylvania delivery is quoted $1 a ton higher and for export 50c. to $1, while steel turnings for domestic consumption are 25c. to 50c. a ton dearer, blast furnace material 50c. and bundled skeleton and most other kinds of scrap are firmer. Dealers are buying more scrap than consumers, and are stocking it in anticipation of still higher prices. Some of them have paid as much or more for material than they did last spring. An improved foundry demand for textile and machinery cast discloses a scarcity of such scrap.

Cincinnati

Extensive dealer activity pushed scrap prices on important items up $1 the past week. While a fair portion of trading is speculative, dealers are also pressing to cover on old commitments. Mills are more susceptible to offers and some contracts, in small amounts, have been closed.

St. Louis

Scrap iron prices were higher largely as the result of higher prices prevailing last week in Chicago and Eastern markets, the advances being from 25c. a ton on melting steel to $1.50 on some wanted specialties. Offerings from the country are smaller. There was no trading by the mills. The Wabash Railway sold a list of 2000 tons of scrap, but none of it went to this market. The Missouri-Pacific and St. Louis-San Francisco each has a list of 2000 tons pending.

New York

The market continues strong. Brokers are having difficulty in drawing out much material from the yards, but attribute the shortage to the debilitating effect of the current hot spell and the fact that the usual gatherers of scrap are off doing something else. Mill sales are in carload lots, and brokers have not found it necessary to raise their buying prices to fill these small tonnages. Buying prices for export, however, have been raised: 50c. on No. 2 steel and No. 2 cast and $1 on stove plate. Probably due to the money situation and the crisis in the Far East, some scrap orders for shipment to Japan have been canceled. Two to three boatloads have been held up—a small amount considering the total Japanese purchases since the first of the year.

Detroit

A little more activity in steel scrap items and less activity in blast furnace items characterized Detroit's scrap market in the last week. Market attitudes still are bullish, with strength shown all along line. Very few items are offered on lists. Ford had 2500 tons of blast furnace material closing Tuesday.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	....	to $22.00
Railroad hvy. mltng....	$23.50	to 24.00
No. 2 hvy. mltng. steel.	18.50	to 19.00
No. 2 RR. wrought.....	21.50	to 22.00
Scrap rails	24.00	to 24.50
Rails 3 ft. and under..	25.50	to 26.00
Comp. sheet steel	21.75	to 22.00
Hand bundled sheets..	19.50	to 20.00
Hvy. steel axle turn...	19.50	to 20.00
Machine shop turn.....	15.50	to 16.00
Short shov. turn.....	15.50	to 16.00
Mixed bor. & turn....	15.00	to 15.50
Cast iron borings	15.00	to 15.50
Cast iron carwheels....	21.50	to 22.00
Hvy. breakable cast...	17.50	to 18.00
No. 1 cupola cast.....	20.00	to 20.50
RR. knuckles & cplrs..	26.50	to 27.00
Rail coil & leaf springs	26.50	to 27.00
Rolled steel wheels.....	26.50	to 27.00
Low phos. billet crops.	26.50	to 27.00
Low phos. sh. bar.....	25.50	to 26.00
Low phos. punchings..	23.50	to 24.00
Low phos. plate, hvy...	25.00	to 26.00
Low phos. plate clips..	23.50	to 24.00
Steel car axles	27.00	to 27.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$19.50	to $20.00
No. 2 hvy. mltng. steel.	17.50	to 18.00
Hydraulic bund., new..	19.00	to 19.50
Hydraulic bund., old...	15.50	to 16.00
Steel rails for rolling..	22.00	to 22.50
Cast iron carwheels...	20.50	to 21.00
Hvy. breakable cast....	19.50	to 20.00
No. 1 cast	21.00	to 21.50
Stove plate (steel wks.)	16.50	to 17.00
Railroad malleable	19.50	to 20.00
Machine shop turn.....	14.00	to 14.50
No. 1 blast furnace ...	13.50	to 14.00
Cast borings	13.50	to 14.00
Heavy axle turnings...	16.00	to 16.50
No. 1 low phos. hvy...	24.50	to 25.00
Couplers & knuckles..	24.50	to 25.00
Rolled steel wheels....	24.50	to 25.00
Steel axles	29.00	to 29.50
Shafting	24.00	to 24.50
No. 1 RR. wrought	19.50	to 20.00
Spec. iron & steel pipe	16.50	to 17.00
No. 1 forge fire	17.00	to 17.50
Cast borings (chem.).	14.50	to 15.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton	
Hvy. mltng. steel.....	$19.50	to $20.00
Auto. hvy. mltng. steel, alloy free	17.50	to 18.00
No. 2 auto. steel	15.50	to 16.00
Shoveling steel	19.50	to 20.00
Hydraul. comp. sheets.	18.50	to 19.00
Drop forge flashings...	16.00	to 16.50
No. 1 busheling	18.50	to 19.00
Rolled carwheels	22.50	to 23.00
Railroad tires, cut	22.50	to 23.00
Railroad leaf springs..	22.00	to 22.50
Steel coup. & knuckles	21.50	to 22.00
Axle turnings	18.00	to 18.50
Coil springs	24.00	to 24.50
Axle turn. (elec.).....	19.00	to 19.50
Low phos. punchings..	22.00	to 22.50
Low phos. plates, 12 in. and under	22.00	to 22.50
Cast iron borings	12.00	to 12.50
Short shov. turnings..	12.50	to 13.00
Machine shop turn. ...	10.50	to 11.00
Rerolling rails	21.50	to 22.00
Steel rails under 3 ft...	22.00	to 22.50
Steel rails under 2 ft...	22.50	to 23.00
Angle bars, steel	22.00	to 22.50
Cast iron carwheels ..	19.50	to 20.00
Railroad malleable	20.50	to 21.00
Agric. malleable	17.50	to 18.00
	Per Net Ton	
Iron car axles	$26.00	to $26.50
Steel car axles	23.50	to 24.00
No. 1 RR. wrought ...	17.25	to 17.75
No. 2 RR. wrought ...	17.25	to 17.75
No. 2 busheling, old..	9.50	to 10.00
Locomotive tires	19.00	to 19.50
Pipes and flues	14.00	to 14.50
No. 1 machinery cast..	16.50	to 17.00
Clean auto. cast.....	15.50	to 16.00
No. 1 railroad cast.....	15.50	to 16.00
No. 1 agric. cast.....	14.00	to 14.50
Stove plate	12.00	to 12.50
Grate bars	13.50	to 14.00
Brake shoes	13.00	to 13.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$20.50	to $21.00
Hydraulic bundles	19.50	to 20.00
Machine shop turn.	15.00	to 15.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$20.00	to $20.50
No. 2 hvy. mltng. steel.	18.50	to 19.00
Comp. sheet steel	18.50	to 19.00
Light bund. stampings.	14.00	to 14.50
Drop forge flashings...	17.50	to 18.00
Machine shop turn.....	13.00	to 13.50
Short shov. turn.....	13.00	to 13.50
No. 1 busheling	18.00	to 18.50
Steel axle turnings....	15.00	to 15.50
Low phos. billet and bloom crops	25.50	to 26.00
Cast iron borings	13.50	to 14.00
Mixed bor. & turn.....	13.50	to 14.00
No. 2 busheling	13.50	to 14.00
No. 1 cast.....	19.00	to 19.50
Railroad grate bars...	11.50	to 12.00
Stove plate	11.00	to 11.50
Rails under 3 ft.	24.00	to 24.50
Rails for rollings	21.00	to 21.50
Railroad malleable	22.00	to 22.50
Cast iron carwheels....	....	21.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$21.00	to $21.50
No. 2 hvy. mltng. steel.	18.50	to 19.00
Scrap rails	21.00	to 21.50
New hvy. b'ndled sheet	18.50	to 19.00
Old hydraul. bundles...	17.50	to 18.00
Drop forge flashings ..	18.50	to 19.00
No. 1 busheling	18.50	to 19.00
Hvy. axle turnings ...	15.50	to 16.00
Machine shop turn.....	12.50	to 13.00
Knuckles & couplers..	23.00	to 23.50
Coil & leaf springs....	23.00	to 23.50
Rolled steel wheels.....	23.00	to 23.50
Low phos. billet crops.	23.00	to 23.50
Shov. turnings	14.00	to 14.50
Mixed bor. & turn.	13.00	to 13.50
Cast iron borings	13.00	to 13.50
Steel car axles	21.00	to 22.00
No. 1 machinery cast..	19.50	to 20.00
No. 1 cupola cast.....	18.00	to 18.50
Stove plate	16.00	to 16.50
Steel rails under 3 ft...	24.00	to 25.00
Cast iron carwheels...	18.00	to 18.50
Railroad malleable	20.00	to 20.50
Chemical borings	13.50	to 14.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:

Selected hvy. metal....	$17.25	to $17.50
No. 1 hvy. melting.....	16.75	to 17.25
No. 2 hvy. melting.....	15.00	to 15.50
No. 1 locomotive tires.	19.00	to 19.50
Misc. stand.-sec. rails.	17.50	to 18.00
Railroad springs	21.00	to 21.50
Bundled sheets	14.00	to 14.50
No. 2 RR. wrought ..	16.25	to 17.25
No. 1 busheling	12.00	to 12.50
Cast bor. & turn.	8.50	to 9.00
Rails for rolling	19.00	to 19.50
Machine shop turn....	9.00	to 9.50
Heavy turnings	13.50	to 14.00
Steel car axles	23.00	to 23.50
Iron car axles	24.00	to 24.50
No. 1 RR. wrought	15.00	to 15.50
Steel rails under 3 ft...	19.50	to 20.00
Steel angle bars	19.00	to 19.50
Cast iron carwheels...	18.00	to 18.50
No. 1 machinery cast...	14.00	to 14.50
Railroad malleable	19.50	to 20.00
No. 1 railroad cast.....	14.00	to 14.50
Stove plate	12.50	to 13.00
Agricul. malleable	12.50	to 13.00
Grate bars	12.00	to 12.50
Brake shoes	12.00	to 12.50

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$18.00	to $18.50
No. 2 hvy. mltng. steel.	15.00	to 15.50
Scrap rails for mltng....	20.00	to 20.50
Loose sheet clippings..	13.50	to 14.00
Hydrau. b'nd'ed sheets	16.50	to 17.00
Cast iron borings.....	11.00	to 11.50
Machine shop turn.	11.50	to 12.00
No. 1 busheling	15.00	to 15.50
No. 2 busheling	8.50	to 9.00
Rails for rolling	22.50	to 23.00
No. 1 locomotive tires..	19.50	to 20.00
Short rails	23.50	to 24.00
Cast iron carwheels....	17.50	to 18.00
No. 1 machinery cast...	16.00	to 16.50
No. 1 railroad cast.....	16.00	to 16.50
Burnt cast	11.50	to 12.00
Stove plate	11.50	to 12.00
Agricult. malleable	18.00	to 18.50
Railroad mal'eable	19.50	to 20.00
Mixed hvy. cast.	14.00	to 14.50

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	$16.00	to $16.50
Scrap steel rails	....	17.00
Short shov. turnings..	9.00	to 10.00
Stove plate	....	10.00
Steel axles	18.00	to 19.00
Iron axles	16.50	to 18.00
No. 1 RR. wrought....	13.00	to 15.00
Rails for rolling	18.00	to 20.00
No. 1 cast	16.00	to 18.00
Tramcar wheels	16.00	to 18.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$17.00	to $17.50
No. 2 hvy. mltng. steel.	16.00	to 16.50
Borings and turnings..	13.00	to 13.50
Long turnings	12.25	to 12.75
Short shov. turnings...	13.50	to 14.00
No. 1 machinery cast...	16.00	to 16.50
Automotive cast.	16.75	to 17.25
Hydraul. comp. sheets.	18.50	to 19.00
Stove plate	10.50	to 11.00
New factory bushel....	17.00	to 17.50
Old No. 2 busheling....	11.50	to 12.00
No. 2 busheling (black fender stock)	13.75	to 14.25
Sheet clippings	13.25	to 13.75
Flashings	15.75	to 16.25
Low phos. plate scrap.	18.00	to 18.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$16.00	to $16.50
No. 2 hvy. mltng. steel.	14.50	to 15.00
Hvy. breakable cast...	15.50	to 16.00
No. 1 machinery cast...	15.50	to 16.00
No. 2 cast.	14.50	to 15.00
Stove plate	11.50	to 12.00
Steel car axles	27.00	to 27.50
Shafting	19.50	to 20.00
No. 1 RR. wrought....	17.50	to 18.00
No. 1 wrought long...	16.50	to 17.00
Spec. iron & steel pipe.	13.00	to 13.50
Rails for rolling	19.00	to 19.50
Clean steel turnings ..	9.50	to 10.00
Cast borings	9.00	to 9.50
No. 1 blast furnace	9.00	to 9.50
Cast borings (chem.)..	12.50	to 13.00
Unprepar. yard scrap..	9.50	to 10.00
Per gross ton, delivered local foundries:		
No. 1 machn. cast.....	$17.00	to $17.50
No. 1 hvy. cast cupola.	14.50	to 15.00
No. 2 cast	14.00	to 14.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$15.80	to $16.30
Scrap rails	16.00	to 16.50
No. 2 steel	14.80	to 15.30
Breakable cast	14.75	to 15.00
Machine shop turn.....	9.75	to 10.00
Mixed bor. & turn.....	9.80	to 10.30
Bund. skeleton long....	12.50	to 12.75
Shafting	18.75	to 19.00
Cast bor. chemical....	9.00	to 10.00
Per gross ton delivered consumers' yards:		
Textile cast.	$18.00	to $19.00
No. 1 machine cast....	18.00	to 19.00

CANADA

Dealers' buying prices at their yards, per gross ton

	Toronto	Montreal
No. 1 hvy. mltng. stl...	$12.50	$12.00
No. 2 hvy. mltng. stl...	11.50	11.00
Mixed dealers steel....	11.00	10.50
Scrap pipe	10.00	9.75
Steel turnings	8.00	8.00
Cast borings	9.25	9.00
Machinery cast.	16.00	15.50
Dealers cast.	14.00	14.00
Stove plate	12.00	11.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges.

No. 1 hvy. mltng. steel.	....	$16.50
No. 2 hvy. mltng. steel.	....	15.50
No. 2 cast.	....	14.50
Stove plate	....	12.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	....	$13.00
No. 2 hvy. mltng. steel.	....	17.00
Rails (scrap)	....	18.00

Philadelphia, delivered alongside boats, Port Richmond

No market at present.

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$37.00
Forging quality	43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	2.10c.

Wire Rods
(No. 5 to 9/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind	48.00
F.o.b. Worcester, Mass.	49.00
F.o.b. Birmingham	50.00
F.o.b. San Francisco	56.00
F.o.b. Galveston	53.00

Rods over 9/32 in. to 47/64 in., inclusive, $5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.45c.
F.o.b. Chicago or Gary	2.50c.
F.o.b. Duluth	2.60c.
Del'd Detroit	2.60c.
F.o.b. Cleveland	2.50c.
F.o.b. Buffalo	2.55c.
Del'd Philadelphia	2.74c.
Del'd New York	2.78c.
F.o.b. Birmingham	2.60c.
F.o.b. cars dock Gulf ports	2.85c.
F.o.b. cars Pacific Ports	3.00c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	2.30c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	2.35c.
F.o.b. Buffalo	2.40c.
F.o.b. Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.70c.
F.o.b. cars dock Pacific ports	2.85c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.55c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.60c.
Del'd Detroit	2.70c.
F.o.b. cars dock Gulf ports	2.95c.
F.o.b. cars dock Pacific ports	2.95c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.40c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.80c.
F.o.b. cars dock Pacific ports	2.80c.

Iron

F.o.b. Chicago	2.40c.
F.o.b. Pittsburgh (refined)	3.60c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.90c.
F.o.b. Cleveland, Chicago and Gary	2.95c.
F.o.b. Buffalo	3.00c.
F.o.b. Detroit	2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago or Gary	2.30c.
Del'd Cleveland	2.435c.
F.o.b. Coatesville or Spar. Pt.	2.35c.
Del'd Philadelphia	2.435c.
Del'd New York	2.53c.
F.o.b. Birmingham	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.
Wrought iron plates, f.o.b. Pittsburgh	3.80c.

Floor Plates

	Base per Lb.
F.o.b. Pittsburgh	3.50c.
F.o.b. Chicago	3.55c.
F.o.b. Coatesville	3.60c.
F.o.b. cars dock Gulf ports	3.90c.
F.o.b. cars dock Pacific ports	4.05c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago	2.30c.
Del'd Cleveland	2.435c.
F.o.b. Buffalo or Bethlehem	2.35c.
Del'd Philadelphia	2.455c.
Del'd New York	2.5025c.
F.o.b. Birmingham (standard)	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Chicago or Buffalo	2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports	3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$42.50
Angle bars, per 100 lb.	2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton	$43.00
Light rails (from rail steel) per gross ton	42.00

	Base per Lb.
Spikes	3.15c.
Tie plates, steel	2.30c.
Tie plates, Pacific Coast ports	2.40c.
Track bolts, to steam railroads	4.35c.
Track bolts, to jobbers, all sizes (per 100 counts)	65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.40c.
No. 10, f.o.b. Gary	2.50c.
No. 10, del'd Detroit	2.60c.
No. 10, del'd Philadelphia	2.69c.
No. 10, f.o.b. Granite City	2.60c.
No. 10, f.o.b. Birmingham	2.55c.
No. 10, f.o.b. cars dock Pacific ports	2.95c.
No. 10 wrought iron, Pgh.	4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	3.15c.
No. 24, f.o.b. Gary	3.25c.
No. 24, del'd Detroit	3.35c.
No. 24, del'd Philadelphia	3.44c.
No. 24, f.o.b. Granite City	3.35c.
No. 24, f.o.b. Birmingham	3.30c.
No. 24, f.o.b. cars dock Pacific ports	3.80c.
No. 24, wrought iron, Pittsburgh	5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	3.10c.
No. 10 gage, f.o.b. Gary	3.20c.
No. 10 gage, f.o.b. Detroit	3.30c.
No. 10 gage, del'd Philadelphia	3.39c.
No. 10, f.o.b. Granite City	3.30c.
No. 10 gage, f.o.b. Birmingham	3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.55c.
No. 20 gage, f.o.b. Gary	3.65c.
No. 20 gage, del'd Detroit	3.75c.
No. 20 gage, del'd Philadelphia	3.84c.
No. 20, f.o.b. Granite City	3.75c.
No. 20 gage, f.o.b. Birmingham	3.70c.
No. 20 gage, f.o.b. cars, dock, Pacific ports	4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.80c.
No. 24, f.o.b. Gary	3.90c.
No. 24, del'd Philadelphia	4.09c.
No. 24, f.o.b. Granite City	4.00c.
No. 24, f.o.b. Birmingham	3.95c.
No. 24, f.o.b. cars, dock, Pacific ports	4.40c.
No. 24, wrought iron, Pittsburgh	6.10c.

Electrical Sheets
(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.35c.
Armature	3.70c.
Electrical	4.20c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	4.10c.
F.o.b. Gary	4.20c.
F.o.b. cars, dock, Pacific ports	4.80c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.50c.
No. 20, f.o.b. Gary	3.60c.
No. 20, f.o.b. Granite City	3.70c.
No. 20, f.o.b. cars dock Pacific ports	4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb.	3.30c.
No. 28, Gary	3.40c.
No. 28, f.o.b. Granite City	3.50c.
No. 28, cars dock Pacific ports, boxed	4.175c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.35
Standard cokes, f.o.b. Gary	5.45
Standard coke, f.o.b. Granite City	5.55

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

Special Coated Manufacturing Ternes

	Base per Box
F.o.b. Pittsburgh	*$4.65
F.o.b. Gary	* 4.75
F.o.b. Granite City	4.85

* Customary 7½ per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

Terne Plate
(*F.o.b. Pittsburgh*)
(Per Package, 112 sheets, 20 x 28 in.)

8-lb. coating I.C	$11.00
15-lb. coating I.C	13.00
20-lb. coating I.C	14.00
25-lb. coating I.C	15.00
30-lb. coating I.C	16.25
40-lb. coating I.C	18.50

Hot-Rolled Hoops, Bands, Strip and Flats under ¼ in.

	Base per Lb.
All widths up to 24 in., Pittsburgh	2.40c.
All widths up to 24 in., Chicago	2.50c.
All widths up to 24 in., del'd Detroit	2.60c.
All widths up to 24 in., Granite City	2.60c.
All widths up to 24 in., Birmingham	2.55c.
Cooperage stock, Pittsburgh	2.50c.
Cooperage stock, Chicago	2.60c.

Cold-Rolled Strip*

	Base per Lb.
F.o.b. Pittsburgh	3.20c.
F.o.b. Cleveland	3.20c.
Del'd Chicago	3.48c.
F.o.b. Worcester	3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

		Pittsburgh and Cleveland	Worcester
Carbon	0.25-0.50%	3.20c.	3.40c.
Carbon	.51- .75	4.45c.	4.65c.
Carbon	.76-1.00	6.30c.	6.50c.
Carbon	Over 1.00	8.50c.	8.70c.

Fender Stock

No. 14, Pittsb'gh or Cleveland	3.45c.
No. 20, Pittsb'gh or Cleveland	3.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

	Per Lb.
Bright wire	2.90c.
Galvanized wire	2.95c.
Spring wire	3.50c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.75
Smooth coated nails	$2.75
Cut nails, carloads	$3.60

	Base per 100 Lb.
Annealed fence wire	$3.20
Galvanized fence wire	3.60
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barbless wire	3.40
Woven wire fence, base column.	74
Single loop bale ties, base col.	63

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh, except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	Wrought Iron In.	Black	Galv.
⅛	..52	31	¼ & ⅜	+13	+35
¼ to ⅜	..55	38½	½	20	1½
½	..59½	49	¾	26	8
¾	..62½	53	1 & 1¼	30	14
1 to 3	..64½	55½	1½	34	16½
			2	33½	16

Lap Weld

2	..57	47½	2	..26½ 10
2½ & 3	..60	50½	2½ to 3½	27½ 12½
3½ to 6	..62	52½	4	..29½ 16
7 & 8	..61	50½	4½ to 8	..28½ 15
9 & 10	..60½	50	9 to 12	..24½ 10
11 & 12	..59½	49		

Butt Weld, extra strong, plain ends

⅛	..50½	36½	¼ & ⅜	+14 +48
¼ to ⅜	..52½	40½	½	21 4
½	..57½	48½	¾	..27 10
¾	..61½	52½	1 to 2	..34 17½
1 to 3	63	55		

Lap Weld, extra strong, plain ends

2	..55	46½	2	..29½ 13½
2½ & 3	..59	50½	2½ to 4	..35 20½
3½ to 6	..62½	54	4½ to 6	..33½ 19
7 & 8	..61½	51	7 & 8	...34½ 19½
9 & 10	..60½	50	9 to 12	..28 15½
11 & 12	..59½	49		

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 9.46	$ 8.41
1¼ in. o.d.	13 B.W.G.	11.21	9.96
1½ in. o.d.	13 B.W.G.	12.38	11.00
1¾ in. o.d.	13 B.W.G.	14.09	12.51
2 in. o.d.	13 B.W.G.	15.78	14.02
2¼ in. o.d.	13 B.W.G.	17.60	15.63
2½ in. o.d.	12 B.W.G.	19.37	17.21
2¾ in. o.d.	12 B.W.G.	21.22	18.85
3 in. o.d.	12 B.W.G.	22.49	19.98
3 in. o.d.	12 B.W.G.	23.60	20.97
4½ in. o.d.	10 B.W.G.	45.19	40.15
8½ in. o.d.	11 B.W.G.	29.79	26.47
4 in. o.d.	10 B.W.G.	36.96	32.83
5 in. o.d.	9 B.W.G.	56.71	50.38
6 in. o.d.	7 B.W.G.	87.07	77.35

Extra for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5	%
12,000 lb. or ft. to 24,999 lb. or ft.	12½	%
6,000 lb. or ft. to 11,999 lb. or ft.	25	%
2,000 lb. or ft. to 5,999 lb. or ft.	35	%
Under 2,000 lb. or ft.	50	%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago.	$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham.	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	56.00
F.o.b. dock, Seattle	56.00
4-in., f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	59.00

Class "A" and gas pipe, $3 extra. 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $46, Birmingham, and $54 delivered Chicago; and 4-in. pipe, $49, Birmingham, and $58 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. x 6 in. and smaller.	65 and 5*
Larger and longer up to 1 in.	60 and 10*
1⅛ in. and larger	60 and 5*
Lag bolts	60 and 10*
Plow bolts, Nos. 1, 2, 3 and 7	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
½ in. and smaller	65
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60

Jobbers discount on above items, 5 per cent.

* Less carload lots and less than full container quality. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:	
½ in. and smaller	60 and 10
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60
Stove bolts in packages, nuts attached	72½
Stove bolts in packages, with nuts separate	72½ and 5
Stove bolts in bulk	80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets
(½-in. and larger)

	Base per 100 Lbs.
F.o.b. Pittsburgh or Cleveland	$3.60
F.o.b. Chicago or Birmingham	3.70

Small Rivets
(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	65 and 5
F.o.b. Cleveland	65 and 5
F.o.b. Chicago and Birmingham	65 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	3.00c.
Delivered, Detroit	3.15c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
200 (½% Nickel)	$0.35
2100 (1½% Nickel)	0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	$2.35
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.90
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.35

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 2c a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	£20 Nominal
Tin plate, per base box	25s. to 25s. 6d.
Steel bars, open-hearth	£11
Beams, open-hearth	£11 2s. 6d.
Channels, open-hearth	£11 7s. 6d.
Angles, open-hearth	£11 2s. 6d.
Black sheets, No. 24 gage	£15
Galvanized sheets, No. 24 gage	£18 15s.

CONTINENTAL

Per Metric Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	£4 7s. 6d.
Wire rods, No. 5 B.W.G.	£6 10s.
Steel bars, merchant	£6
Sheet bars	£4 8s. 6d.
Plate ¼ in. and up	£7 7s.
Plate 3/16 in. and 5 mm.	£7 12s.
Sheet, ⅛ in.	£8 9s. 6d.
Beams, Thomas	£5 8s.
Angles (Basic)	£5 8s.
Hoops and strip, base	£6 10s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Per Net Ton
Plates	3.70c.
Structural shapes	3.70c.
Soft steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$4.48
Spikes, large .....1 to 24 kegs	3.90c.

	Per Cent Off List
Track bolts, all sizes, per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	$4.35
Wire, black, soft ann'l'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg	3.00c.
Cement coated nails, per keg	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

**Prices on application.

CHICAGO *Base per Lb.*

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	4.40c.
Track bolts (keg lots)	5.60c.
Rivets, structural (keg lots)	4.60c.
Rivets, boiler (keg lots)	4.70c.

	Per Cent Off List
Machine bolts	*60
Carriage bolts	*60
Lag screws	*55 and 5
Hot-pressed nuts, sq. tap or blank	*60
Hot-pressed nuts, hex. tap or blank	*60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	$4.00 off list
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	$4.55
Com. wire nails, 15 kegs or more, per keg	$3.20
Cement c't'd nails, 15 kegs or more, per keg	$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK *Base per Lb.*

Plates, ¼ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. charcoal	7.00 to 7.25c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.
Bands	4.32c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'l'd sheets (No. 24*)	4.50 to 4.82c.
Galvanized sheets (No. 24*)	5.47c.
Long terne sheets (No. 24)	5.50 to 6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) for quantities 400 to 1499 lb.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.32c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, ⅛ in. and heavier	5.90c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.25c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x ½ in. and larger	4.61c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	3.25c.

	Per Cent Off List
Machine bolts, square head and nut:	
All diameters. Prices on application	
Carriage bolts, cut thread:	
All diameters. Prices on application	

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

† 125 lb. and more.

ST. LOUIS *Base per Lb.*

Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel(squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	4.94c.
Boiler rivets	5.04c.

	Per Cent Off List
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

* No. 26 and lighter take special prices.

PHILADELPHIA

Base Per Lb.

*Plates, ¼-in. and heavier	3.80c.
*Structural shapes	3.80c.
*Soft steel bars, small shapes, iron bars (except bands)	3.90c.
‡Reinforc. steel bars, sq. twisted and deformed	3.43c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.25c.
*Steel bands, No. 12 and 3/16 in. incl.	4.00c.
Spring steel	5.40c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	3.90c.
Diam. pat. floor plates, ¼ in.	5.45c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

Base per Lb.

Plates and struc. shapes	3.86c.
Soft steel bars	3.75c.
†Reinforc. steel bars	3.60c.
‡Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c
*Black ann'l'd wire, per 100 lb	$3.40
*No. 9 galv. wire, per 100 lb	3.80
*Com. wire nails, base per keg	2.95

	Per Cent Off List
Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count	
½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

†Outside delivery 10c. less.

*For 5000 lb. or less.

‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI *Base per Lb.*

Plates and struc. shapes	3.95c.
Floor plates	5.85c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain. lin. per 100 lb.	8.35

	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$21.80
4-in.	52.45
Lap-welded steel boiler tubes, 2-in.	20.73
4-in.	48.41

BUFFALO *Base per Lb.*

Plates	3.92c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg	$3.26
Black wire, base per 100 lb. (2500-lb lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON *Base per Lb.*

Channels, angles	4.20c.
Tees and zees, under 3"	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, ¼ thick and heavier	4.08c.
Floor plates, diamond pattern	6.03c.
Bar and bar shapes(mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.94c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

* Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	5.16c.
Boiler rivets, cone head (keg lots)	5.26c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots)	5.81c.
Black annealed wire (No. 6 to No. 9 incl.)	4.05c.
Com. wire nails and cement coated nails 1 to 14 kegs	3.25c.

	Per Cent Off List
Machine bolts and carriage bolts, ½x6 and smaller or shorter	65
Larger and longer up to 1 in., diam.	60-5
1⅛ in. and larger	60
Coach and lag screws	60-5
Hot-pressed nuts, sq. and hex. tapped or blank, 1-199 lb.	50
200 lb. and over:	
½ in. and smaller	65
9/16 to 1 in.	60- 5
1⅛ in. and over	50-10-5

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.35c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons	3.16c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates ¼ in. and heavier	5.80c.
Galvanized sheets, No. 24, 100 bdls. or more	$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

	Base per Lb.
Mild steel bars	4.21c.
Iron bars	4.21c.
Reinforcing bars	4.21c.
Structural shapes	4.11c.
Plates	4.11c.
Hot-rolled sheets No. 10	4.16c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.41c.
Cold-finished bars	4.86c.

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* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	5.15c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	55

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	$3.30
Bolts and nuts, per cent off list	60

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.975c.	2.975c.	3.625c.
Hot-rolled annealed sheets (No. 24)	5.15c.	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	$3.65	$3.60	$3.70

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$54.00
First quality, New Jersey	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00
Second quality, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	8.00

5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (Eastern)	9.50

5 per cent trade discount on silica brick.

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	$69.00
Chemically bonded, f.o.b. Baltimore	59.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash.	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered San Francisco, Los Angeles or Seattle	$26.50
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

Fo.b. Everett, Mass.	$25.75
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.50
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$28.50

Gray Forge

Valley or Pittsburgh furnace	$23.50

Charcoal

Lake Superior furnace	$27.00
Delivered Chicago	30.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$102.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$33.00
F.o.b. New Orleans	33.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$27.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.80
Ferrotungsten, lots of 5000 lbs.	1.85
Ferrotungsten, smaller lots	1.90
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.50c.*
Ferrochromium, 2% carbon	16.50c. to 17.00c.*
Ferrochromium, 1% carbon	17.50c. to 18.00c.*
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.*
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.*
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	$2.50*
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	63.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn.	80.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered.	
3%	101.50
2.50% carbon grade	106.50
2% carbon grade	111.50
1% carbon grade	121.50

* Spot prices are $5 a ton higher. Spot premium on 75 per cent ferrosilicon is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10
Mesabi, non-Bessemer, 51.50%	$4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	Nominal
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	52c.
Man., African, Indian, 44-48%	Nominal
Man., African, Indian, 49-51%	Nominal
Man., Brazilian, 46 to 48½%	Nominal

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	$23.50 to $25.50
Tungsten, domestic, scheelite delivered	Nominal
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)	$16.00
Rhodesian, 45%	23.00
Rhodesian, 48%	26.75
Turkish, 48-49%	25.50 to $26.50
Turkish, 45-46%	23.50 to 24.00
Turkish, 44%	19.00 to 19.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
50%	$25.50 to $26.50
48-49%	24.50 to 25.00

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$20.00
Domestic, barge and rail	21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	21.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	5.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	5.25c.
Del'd Ch'go, No. 3 industrial	4.15c.
Del'd Ch'go, No. 5 industrial	4.00c.
Del'd Cleve'd, No. 3 distillate	5.75c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

COKE AND COAL

Coke *Per Net Ton*

Furnace, f.o.b. Connellsville, Prompt	$4.35 to $4.60
Foundry, f.o.b. Connellsville, Prompt	5.00 to 6.25
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.85 to 11.30
Foundry, by-product, Philadelphia	10.60
Foundry, by-product, delivered Cleveland	11.00
Foundry, by-product, delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal *Per Net Ton*

Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

Practical Methods of Reducing High Electrical Costs

(CONTINUED FROM PAGE 47)

disturbing the volume of production.

How may this accurate operating data be secured, without undue cost? There are many ways of doing the job, but one of the easiest and simplest of all consists in the use of the recording, or graphic wattmeter. This is an instrument which traces a record of the actual use of power on a moving chart, minute by minute, for any machine, group of machines, or an entire plant. An illustration of a typical instrument is given in Fig. 1. For occasional use the portable type is recommended, although the panel mounted instrument is more desirable for continuous checking purposes.

A typical set of "before and after" records from such an instrument is shown in Fig. 2. At the left is shown the first power use record over a 2¼-hour period of the motor driving a molten lead pump in the Willard storage battery plant. The trace is extremely irregular, and while indicating an average of around 0.2 kw. demand, shows also a peak of 0.73 kw. in one instance, of 0.58 kw. in another, and of 0.45 kw. in still a third, while half-way across the chart (reading from right to left) a six-minute period is shown where practically no power was used at all, indicating a temporary break-down. From previous tests, the engineers knew what a normal record on this equipment should be, and realized that something was wrong with the pump. It was stripped down, repaired, and put into operation again, and a second test made. The record of that test is shown at the right. Notice the evenness of the trace now, varying generally between 0.10 and 0.12 kw., with a maximum peak of 0.2 kw. This illustrates what may be done to check the inefficient operation of a single piece of equipment.

But the machines may be in excellent shape, and working as efficiently as possible, yet excessive loads will be caused by faulty scheduling of operation. Again an instrument test records the facts. In Fig. 3 there is shown the before-and-after record of the power use of a 500 hp. motor driving five rubber mixing mills. At the left the chart shows the excessive peaks caused at those times when all five mills were doing maximum work at the same time, due to the practice of charging them with fresh batches every half-hour at intervals of but one minute between each charge. With an average demand of around 200 kw., peaks in excess of 400 kw. were reached during the charging periods. Analysis of this chart brought a revision of charging procedure—the interval between the charging of one mixer and another being lengthened to five minutes. *No other change was*

Model 'UL' Gusher Pump with Polyphase Motor.

"GUSHER"
COOLANT PUMPS

have no packings, require no priming, and can be throttled to any desired flow,—independent of the speed of the machine.

Modernize your equipment with the IMPROVED GUSHER Pump.

THE RUTHMAN MACHINERY COMPANY
537 EAST FRONT ST., CINCINNATI, OHIO

CHECK THESE POINTS
on the
WELLS BAND SAW

EFFICIENT
ECONOMICAL
VERSATILE
ACCURATE
FAST

No. 8 Size 8" diameter round or 8" x 16" flat
No. 5 Size 5" diameter round or 5" x 10" flat

Run down the list of advantages a Wells Band Saw has. Then consider what these features would mean to you. Those jobs of cutting bars, angles, tubes and other miscellaneous work can be handled a lot quicker and more accurate with a Wells Saw. We will gladly send you a folder without obligation.

WELLS MFG. CORP.
THREE RIVERS . MICHIGAN

made—in procedure or equipment. The chart to the right shows the resulting power use of the equipment under the new schedule—average demand still around 200 kw., but maximum demand reduced to slightly over 300 kw. Here is a clear saving of 25 per cent in maximum demand, due to management alone.

At their best, power use surveys form a process of continuous research throughout the plant, to discover where improvements can be made. They reveal losses and wastes in power and labor which can be overcome; they disclose where maintenance is needed; they point out where production processes can be bettered. The instruments used have to do with facts bearing on four elements of the production problem; 1, the actual use of power; 2, the condition of the equipment using the power; 3, the effective use of employee time; and 4, the scheduling of processes and the handling of equipment by management and employees together.

The first thing that makes consideration of total plant load important is the check it affords on maximum demand. Frequently the pyramiding of peak loads, due to simultaneous starting of equipment, or the simultaneous operation of intermittently used machinery, may cause a momentary demand out of all proportion to normal loads. Any practice or oversight which results in increased demand will cause a corresponding variation in the trace of the record of total plant load. In addition it tells how long lights and motors stay on the line after the plant stops production at night; what the load is during the noon hour, at night, on Sundays and holidays; how long motors are running before the work actually starts; how long it takes to get the whole plant going at full load in the morning and after the noon hour rest; and whether there is a noticeable anticipation of quitting time at noon and in the evening.

With a power factor meter in addition, an occasional check of the overall power factor of the operating load may be made—in turn revealing the possibilities of securing increased efficiency by improvement of this situation.

Economical and continuous operation of an industrial plant requires a voltage supply maintained at proper value, in order to permit heavily loaded motors to start their loads and to carry them continuously. Observation of this factor requires the use of a voltmeter.

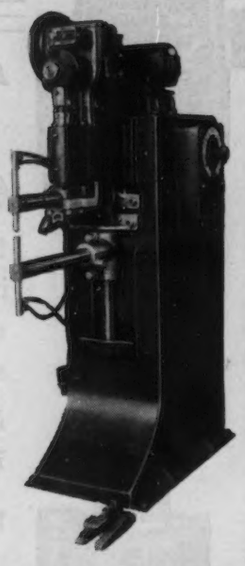
These three basic instruments furnish the testing equipment required for an intelligent plant power-use survey—a recording wattmeter, a power factor meter and a voltmeter. With them you may obtain the data necessary to ascertain what the maximum plant load is, when it occurs (whether at regular or irregular intervals), its relation to normal load, how normal load is affected by employee working habits, the power factor of operation, the voltage changes that occur, and when they occur.

Then the same observations, carried out department by department, will give the clues as to where factors which look wrong may be

A New SWIFT

Motor Driven, Cam Operated

SPOT WELDER



All working parts are enclosed in an oil tight housing.

Designed for high speed production.

Motor required 1/2 HP., 1800 RPM.

SWIFT ELECTRIC WELDER CO., 6560 EPWORTH BLVD., DETROIT

Welding machines hand, hydraulic, cam or air operated of the following types: spot, seam, projection, flash, butt, flue and pipe, and gun welding units.

THE RETURN PROVES IT!

Watch the return of a Wissco Belt. Note the uniform curve it takes even at high speed. This proves perfect articulation. There is no binding of the bearings in Wissco Belt design. They ride smoother and do not wear themselves out due to internal friction.

WICKWIRE SPENCER STEEL CO.

41 East 42nd St., New York City

Buffalo Worcester Chicago San Francisco

WISSCO CONVEYOR BELTS

Send for the Wissco Conveyor Belt Handbook.

found. Here another item of information may be checked also—the friction load, or the amount of power consumed merely in overcoming friction. This is measured by checking the amount of power required to operate all the machines in a department running idle, against the power taken by the machines running under load. The departmental check will usually give some rather direct clues as to the reasons for low power factor, if that exists, and poor voltage.

Finally, each piece of electrically driven equipment (or group of machines, if they are driven by group motors) should be similarly checked, for it is here that application and use losses of power are chiefly to be found. The rating of the motor should be compared with the records of maximum, average and minimum loads actually imposed upon it, to determine whether the motor is of the correct size, or is under or over loaded. If the voltage at the motor terminals is not of the correct value, inefficient operation will be the result. If the power factor of operation of the motor is low, the situation should be studied in relation to the whole department, to determine ways and means of improving departmental, or plant power factor. Then the idle, or friction load of the equipment should be studied; the operating load characteristics examined to see whether the equipment is in good operating condition or needs repair; and the advisability of grouping drives of like characteristics now operating unit-driven, examined in detail. Finally the work of all the equipment should be studied to determine whether any particular unit is one which can be operated on "off-peak" service, to reduce maximum demand; to determine whether there is any unnecessary loss of time on the part of the operator; and how the record of any unit compares with the records of similar equipment in use elsewhere in the plant.

It has often been said of steel mill operation that *nothing* is allowed to interfere with production. Consequently demand control is automatically ruled out, since there are no non-essential loads which can be shut down on short notice to offset the peak demands of essential loads. However, this does not interfere with the possibility of deliberately scheduling work in itself so that demand peaks either are not incurred, or their severity reduced. In this connection I have recently been told the story of a steel mill which, in accepting a single order for the rolling of some difficult alloy steel, ran up their demand charge for the month so high that it more than used up the profit on the job.

Systematic analyses of power application, power use, operating loads and production schedules made with power use instruments usually disclose shortcomings and oversights on the part of men and management, and the possibilities of improvement in the operation of equipment and the planning of schedules. Mere tests do not, of course, correct conditions. They only furnish information. But information, accurate and reliable, must be obtained before bad conditions can be intelligently remedied.

Results Are What Count

If you want real economy—look to results rather than to first cost. It is on this basis that "HERCULES" (Red-Strand) Wire Rope continues to make and hold friends. There are reasons, of course, why this wire rope is so dependable and long lasting, and we are always glad to give full details to everyone interested in saving money. Made in a wide range of constructions including Round Strand, Flattened Strand, Preformed, Non-Rotating and Steel Clad types.

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5909 Kennerly Avenue, St. Louis, Mo.

NEW YORK—CHICAGO—DENVER—SAN FRANCISCO

PICKLING EQUIPMENT LASTS LONGER—

when made from

AMPCO AMPCO **METAL**

The combination of:
Superior acid resistance.
High tensile strength.
Freedom from brittleness.
Ampco Metal quality standards
—assure the best in corrosion-resistant equipment.

AMPCO METAL, Inc.

MILWAUKEE, WISCONSIN

..TRADE NOTES..

Caterpillar Tractor Co., through its general sales manager, E. R. Galvin, has announced the following changes in its sales department: Paul Weeks, who was manager of the Washington office until his transfer to the Peoria, Ill., offices about two years ago, returns to the Capitol post, relieving E. B. English, who as a newcomer to Peoria, will become manager of Federal and State sales. H. H. Howard, who has been in the employ of the company since 1926 in export and domestic sales capacities, has been appointed manager of the engine sales division.

Mercoid Corp., 4201 Belmont Ave., Chicago, announces the opening of a new office at 1035 Cathedral Street, Baltimore. A complete stock of Mercoid automatic controls will be carried at the new office, under the management of John Jex, Jr.

Momsen-Dunnegan-Ryan Co., El Paso, Tex., has been named distributer of Enduro stainless steel, and **Odell Hardware Co.**, Greensboro, N. C., has been appointed distributer of Toncan iron sheets, according to an announcement by N. J. Clarke, vice-president in charge of sales, Republic Steel Corp., Cleveland.

Stein-Brill Corp., 183 Varick Street, New York, has changed its corporate name to the Brill Equipment Corp. There will be no change in management. The company has opened a St. Louis office and warehouse in the Mart Building. Both offices will specialize in machinery and equipment for the following industries: Chemical, pharmaceutical, food products, wine and liquor, paint, soap, rock products, plastics, oil refining, rubber, and paper mill. The St. Louis branch will also represent several nationally known machinery manufacturers in the St. Louis territory, and will have display rooms in the Mart Building for this purpose.

Schramm, Inc., West Chester, Pa., air compressor manufacturer, on Sept. 1, will occupy its new plant addition, having 25,000 sq. ft. of floor space, which will house the assembly lines, painting, testing and storage departments.

TRY this test. Learn another reason for Dings Separator superiority. Suspend a steel screw from a string attached to a support. Place a steel spacer piece on the pole ends of an ordinary magnet—a bronze or brass spacer on the ends of a similar magnet. Move the magnets from equal distances and at the same rate of motion toward the screw. Snap! That screw will jump and be firmly held by the magnet with bronze or brass spacer. Steel spacers short circuit magnetic lines of force, weakening the magnetic pull. Bronze spacers preserve the magnetic strength and assure a stronger magnetic pull that makes possible a cleaner product.

Bronze spacer rings are standard in Dings separators, whereas separators of other manufacture use steel. This is the reason why Dings separators are the strongest separators on the market, size for size!

Don't risk losses through imperfect castings. There's no obligation in consulting with us on the best methods of obtaining iron-free sand.

Dings High Intensity MAGNETIC SEPARATION

DINGS MAGNETIC SEPARATOR CO., 727 Smith Street, Milwaukee, Wisconsin

Manufacturers Have A Word For It ~~

BISCO

When manufacturers need alloy or tool steel tubing they call for Bisco. They know we devote all of our time and energies to this one type of product, and the product reflects the skill in its making.

Quick delivery on Tool Steel Tubing, Ball Bearing Tubing, Stainless Tubing, Aircraft Tubing, Cold Drawn Mechanical Tubing, A.S.M.E. Boiler Tubing.

Call Bisco for tool steel tubing.

THE BISSETT STEEL COMPANY

The Tubing Specialists

Cleveland, O.

Foundrymen Set 1938 Convention Date

DIRECTORS of the American Foundrymen's Association have announced that the 1938 convention of the association will be held in Cleveland, May 14-19. The convention and exhibition will occupy the facilities of the public auditorium and Lakeside exhibition hall. The technical sessions will be held in the auditorium meeting rooms.

American Rolling Mill Co. reports for the second quarter the highest earnings in the history of the company. Net figure was $4,321,855, equal, after all charges except surtax on undistributed profits, to $1.50 a share on 2,868,513 shares of common stock. Last year's second quarter earnings were $1,561,161, or 68c. a common share. Net earnings for the half year were $6,642,771. After provisions for preferred dividends this is equal to $2.30 a common share, as against $2,305,064, or $1.02 a share for a similar period in 1936. Payrolls for Armco's 18,000 men established an all-time record at $16,775,000 for the half year.

Atlanta, Ga., office of Carnegie-Illinois Steel Corp. was transferred August 1 to Birmingham, under the direction of Meryl H. Geisking, manager of sales. J. T. Moore, who has been in charge at Atlanta, will be associated with Mr. Geisking at Birmingham.

New Industrial Literature

A REVIEW OF CURRENT CATALOGS AND CIRCULARS · A TIME SAVING SERVICE FOR BUYERS

WELDED PIPING DESIGN.—Linde Air Products Co. Complete handbook information on design and layout of piping for welded connections is contained in this 200-page booklet. Subjects covered present the answer to practically every problem that might be encountered in installing or applying welded pipe. Bulletin 8-34.

ELECTRIC FURNACES AND HEATING ELEMENTS.—Hoskins Mfg. Co. Catalog 56 contains comprehensive information on heat treating furnaces, laboratory furnaces and pyrometers. Numerous illustrations present various features of the equipment, and complete specifications are included. Catalog L presents data on Chromel wire, the heating element used in the furnaces, which is also available to other manufacturers. Bulletin 8-35.

V-BELTS.—Rockwood Mfg. Co. Booklet 795 containing complete listing of applications for single groove V-belts. Gives sizes required for various makes of refrigerators, gasoline pumps, oil burners, etc. Comparison chart of other manufacturers' belt numbers is also included. Bulletin 8-36.

CUPOLA CHARGERS.—Whiting Corp. Bulletin 221, describing and illustrating skip-hoist chargers for use with small cupolas. Machine eliminates the need of a charging floor. Bulletin 8-37.

PATTERN WOOD.—Western Pine Association. Booklet presents a discussion of sugar pine grades commonly selected for pattern uses, and points out the advantages of various sizes and grades. Illustrated with examples of unusual patterns constructed from sugar pine wood. Bulletin 8-38.

MANGANESE STEEL APPLICATIONS.—American Manganese Steel Co. July issue of AMSCO BULLETIN illustrating various applications of manganese steel where abrasion resistance is desired, including wire rope sheaves, dipper teeth, rolls, and railroad equipment. Bulletin 8-39.

DIESEL ENGINES.—Caterpillar Tractor Co. 32-page booklet presenting a pictorial record of the various types of construction machinery powered by Caterpillar diesel engines. Bulletin 8-40.

AIRCRAFT TUBING.—Summerill Tubing Co. Folder discussing oxide free aircraft tubing providing 85,000 lb. psi., minimum yield, under standard practice. Bulletin 8-41.

REFRACTORY CEMENT.—Refractory & Insulation Corp. Plastic bonding cement with fusion point of 3012 deg. F. is described in this publication. Material is designed for use in making boiler settings and laying brick work in industrial ovens, etc., where a durable, air-setting cement is desirable. Bulletin 8-42.

MINE FANS.—Jeffrey Mfg. Co. Three bulletins describing Retrovane, Aerodyne and stepped multi-blade mine fans adaptable for blowing or exhausting service. Performance data and photographs of various fan house arrangements are included. Bulletin 8-43.

OUTDOOR CIRCUIT BREAKERS.—General Electric Co. Revised edition of bulletin GEA 2406 covering oil-blast circuit breakers for outdoor service. Includes all dimensions. Bulletin 8-44.

CO_2 RECORDING EQUIPMENT.—Leeds & Northrup Co. Catalog N-91-163 describing Micromax CO_2 recording equipment for continuous flue gas analysis. Recorder is of the saturated-gas type, a.c. operated, and may be secured in dial or continuous strip-chart styles. Bulletin 8-45.

STEEL MILL CONVEYORS.—Mathews Conveyor Co. An attractively illustrated, 104-page, treatise on various types of conveyors used in steel mills. Diagrams and photographs are profusely used to illustrate text. Bulletin 8-46.

INDUSTRIAL FINISHES.—Roxalin Flexible Lacquer Co., Inc. Information on the characteristics of smooth leafing aluminum paint and chip proof, cellulose type, black air-dry enamel is presented in two file pockets. Samples of finishes applied on brass and steel are supplied for testing purposes. Bulletin 8-47.

ROLLER CHAIN EQUIPMENT.—Whitney Chain & Mfg. Co. Catalog containing complete listing of roller chain and sprockets in stock and made-to-order types. Includes hp. ratings of chain and other engineering data. Bulletin 8-48.

OVERLAY MATERIAL.—Colmonoy, Inc. Booklet announcing a new material for producing a welded-on, wear, heat and corrosion resistant overlay or hard facing. Material is supplied in paste form and may be applied to any desired thickness. Bulletin 8-49.

WOOD BORING MACHINES.—B. M. Root Co. General Catalog No. 84, listing information on horizontal and vertical multiple spindle wood boring equipment, wall board sawing machines and lumber hoists. Borers are equipped with universally adjustable spindles. Bulletin 8-50.

METALLURGICAL LABORATORY EQUIPMENT.—Adolph I. Buehler. A booklet illustrating cutting machines, bakelite presses and specimen grinders for laboratory work. A section is devoted to microscopes and photographic equipment for photomicrography. Bulletin 8-51.

INDUSTRIAL HEATING EQUIPMENT.—Industrial Gas Engineering Co., Inc. Engineering data book covering Thermo insulated high-temperature exhausters and universal gas and oil-fired heating units for core baking, enameling, heat treating and other processes. Features of a universal precision air draw furnace are also described. Bulletin 8-52.

CUTTER GRINDERS.—Pratt & Whitney division Niles-Bement-Pond Co. Eight-page circular describing construction and application of Keller cutter and radius grinder. Illustrations include many close-ups of actual operations. Bulletin 8-53.

MATERIALS HANDLING EQUIPMENT.—Mercury Manufacturing Co. 44-page booklet illustrating and describing company's line of tractors, trailers and lift trucks. Illustrations of products in actual use and specifications are included. Bulletin 8-54.

PNEUMATIC TOOLS.—The Independent Pneumatic Tool Co. Bulletin illustrating and containing specifications for rotary air drills, rotary brushes, air grinders, hammers, screw drivers, etc. Rotary tool construction is explained in diagram with features particularly emphasized. Bulletin 8-55.

REBUILT POWER EQUIPMENT.—Chicago Electric Co. 56-page bulletin listing current stocks of new and rebuilt power equipment. Contains descriptions, illustrations and list prices. Bulletin 8-56.

STAINLESS STEEL TUBES.—Globe Stainless Tube Co. Bulletin describing advantages of stainless steel tubes, their chemical and physical properties, fabrication and finishes. Also contains strength graph. Bulletin 8-57.

GRINDING WHEELS.—Abrasive Co. Bulletin outlining features of nut-inserted disks for disk and surface grinding. Also, circular giving data and list prices on Borolon and Electrolon general-purpose grinding wheels. Bulletin 8-58.

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PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

American Cyanamid Co., 30 Rockefeller Plaza, New York, has leased about 475 acres at Frost Lake, near O'Donnell, Tex., for new plant for production of raw materials for sodium sulphate and allied specialties. It will include storage and distributing facilities, power house, pumping station and other mechanical divisions. Cost close to $200,000 with machinery.

General Foods Corp., 250 Park Avenue, New York, has let general contract to H. K. Ferguson Co., Hanna Building, Cleveland, for new multi-story corn and cereal food products mill at Kankakee, Ill., where 32-acre tract recently was acquired. Plant will include storage and distributing buildings, power house, machine shop and other structures. Cost over $400,000 with equipment. James Mullins, heretofore connected with Post Products Division of General Foods Corp., Battle Creek, Mich., will be manager at new mill.

Riegel Paper Corp., 342 Madison Avenue, New York, has engaged J. E. Sirrine & Co., Greenville, S. C., consulting engineers, to prepare plans for new pulp mill near Wilmington, N. C., where large tract recently was purchased. It will include storage and distributing buildings, power house, machine shop and other structures. Cost close to $3,000,000. Main paper mill of company is at Milford, N. J.

Bureau of Supplies and Accounts, Navy department, Washington, asks bids until Aug. 20 for one motor-driven boring, milling and drilling machine (Schedule 1406), bearing for boat crane king post (Schedule 1424) for Brooklyn Navy Yard.

American Locomotive Co., 30 Church Street, New York, has plans for one-story addition to plant at Schenectady, N. Y., for expansion in foundry department. Cost close to $50,000 with equipment.

United States Engineer Office, First District, 39 Whitehall Street, New York, asks bids until Aug. 17 for castings for dredge W. L. Marshall, including cast bronze, cast chrome nickel steel, etc. (Circular 12).

Brewster & Co., Inc., plant, 2701 Bridge Plaza North, Long Island City, New York, manufacturer of automobile bodies, will be offered at public sale Aug. 18, including quantity of machine tools, hand tools and other mechanical equipment.

Mather Spring Co., 755 Castle Boulevard, Toledo, Ohio, manufacturer of steel springs for automobiles and motor trucks, has purchased about eight acres at Linden, N. J., for new Eastern branch plant, initial unit to be one-story, 220 x 420 ft., with smaller adjoining buildings. Cost over $200,000 with machinery. Erection will begin early in fall.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Aug. 16 for 4200 brass external gears, 4200 brass internal gears and 4200 brass drive gears (Circular 53), brass forgings (Circular 39).

Essex County Board of Education, 31 Green Street, Newark, N. J., asks bids until Aug. 18 for engine lathes, wood-turning lathes, metal-melting furnace, metal-working furnace set, oil tempering furnace, steel tool cabinet, welding bench, manual training benches, bench furnaces, drill presses, steel lockers, steel shelving, electric welder and bench vises for County vocational schools.

State Purchase Commissioner, State House, Trenton, N. J., asks bids until Aug. 16 for one lathe and one shaper.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 17 for one motor-driven thread-grinding machine (Schedule 1396), one electric-operated bake oven (Schedule 1395); until Aug. 20, 23 portable electric drills (Schedule 1402) for Philadelphia Navy Yard.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Aug. 19 for one 1000-ton hydraulic turret-type heading press (Circular 38).

Murphy Door Bed Co., 19 West 44th Street, New York, has purchased part of plant of Nicholson File Co., Paterson, N. J., consisting of 122,000 sq. ft. with one-story factory building totaling about 40,000 sq. ft. Entire Nicholson plant covers about five and one-half acres with buildings containing about 170,000 sq. ft. of floor space. Purchasing company will use plant for manufacture of kitchen cabinets.

BUFFALO DISTRICT

Buffalo Pressed Steel Co., 500 Smith Street, Buffalo, manufacturer of exhaust mufflers for automobiles and motor trucks, and kindred automotive steel products, has acquired tract in Wickliffe district, Youngstown, for new one-story plant, to be developed as main works of company. Certain equipment will be removed from Buffalo plant to new location and additional machinery installed. General offices of company will be established at Youngstown. Cost about $100,000 with equipment.

Remington-Rand, Inc., 465 Washington Street, Buffalo, manufacturer of typewriters, office accounting machines, etc., has let general contract to Austin Co., Cleveland, for one-story addition to plant at Tonawanda, N. Y., 180 x 220 ft., for production of steel filing cabinets and kindred steel office equipment. All such manufacture will be concentrated in new unit in future, vacated space in other buildings at local plant to be used for expansion in other divisions. Cost over $200,000 with equipment.

NEW ENGLAND

Jenkins Brothers, Bridgeport, Conn., manufacturers of valves and kindred products, have leased two-story building at 374-76 Spring Street, Atlanta, Ga., and will remodel for new factory branch, storage and distributing plant.

Landers, Frary & Clark, Inc., New Britain, Conn., manufacturer of domestic electric heating and cooking appliances, etc., has let general contract to A. F. Peaslee, Inc., 15 Lewis Street, Hartford, Conn., for one and five-story additions, 120 x 120 ft., and 85 x 120 ft., respectively, for expansion in electric refrigerator and electric stove divisions. Cost close to $175,000 with equipment. W. F. Brooks, Lewis and Gold Streets, Hartford, Conn., is architect.

Commanding Officer, Ordnance Department, Watertown Arsenal, Watertown, Mass., asks bids until Aug. 30 for one multi-station punch press (Circular 16).

Salem Oil & Grease Co., 60 Grove Street, Salem, Mass., has let general contract to E. H. Porter Construction Co., 13 Wallis Street, Peabody, Mass., for one-story addition, 38 x 65 ft., and adjoining one-story unit for boiler house. Henry N. Otis, 220 Locust Street, Danvers, Mass., is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 17 for one motor-driven surface grinding machine for Newport, R. I., Naval Station (Schedule 1393).

WASHINGTON DIST.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Aug. 25 for automatic combustion control system for stoker-operated boilers in power house, Norfolk Navy Yard, Portsmouth, Va. (Specifications 8511); also bids (no closing date stated) for water-softening equipment and continuous blow-down system, same power house (Specifications 8512).

Ford Motor Co., Dearborn, Mich., has let general contract to Virginia Engineering Co., Newport News, Va., for one-story addition, 300 x 520 ft., to branch assembling works at Norfolk, Va., and to Merritt-Chapman & McLean Corp., Fidelity Building, Baltimore,. for 400-ft. dock near works for water shipment. Cost over $500,000 with equipment, including cranes, hoists and other mechanical-handling equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Commanding Officer, Aberdeen Proving Grounds, Aberdeen, Md., asks bids until Aug. 16 for steel studs, galvanized pipe caps, galvanized pipe posts, chain link wire fencing, braces, brace ends, etc. (Circular 15).

Hunter Baltimore Rye Distillery, Inc., 405 West Redwood Street, Baltimore, has let general contract to G. Walter Tovall, Inc., Eutaw and Monument Streets, for four-story addition, 60 x 100 ft., at Gwynnbrook, Md., distillery, primarily for storage and distribution. Cost over $75,000 with equipment. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 17 for one hand-operated arbor press (Schedule 1399) for Charleston, S. C., Navy Yard; one electric furnace (Schedule 1293); until Aug. 20, parts for airplanes (Schedule 900-1026), one concrete mixer (Schedule 1379), carburetor assemblies for airplanes (Schedule 900-1028); until Aug. 24, turbine-driven pumping units (Schedule 1219); until Aug. 27, steel body gate valves (Schedule 1411) for Eastern and Western yards.

SOUTH ATLANTIC

Link-Belt Co., 1116 Murphy Avenue, S.W., Atlanta, Ga., manufacturer of elevating, conveying, loading and other equipment, has let general contract to A. K. Adams Co., 542 Plum Street, N.W., for one-story addition, 30 x 285 ft. Cost over $65,000 with equipment. Headquarters of company are at Chicago.

City Council, Thomasville, Ga., asks bids until Aug. 16 for one 2500-kw. steam turbo-generator unit and accessories, condenser and auxiliary station equipment for municipal electric power plant. D. R. Pringle is superintendent of water and light department.

SOUTH CENTRAL

United States Engineer Office, Second District, New Orleans, asks bids until Aug. 21 for one five-drum, cross deck, lay shaft-type hauling and hoisting winch for dredge, with steam engine-drive and operating control mechanism, and spare parts (Circular 35).

Great National Oil Corp., Shreveport, La., plans new natural gasoline plant on site acquired in Caddo Parish, La., including steel tank storage and distributing department, boiler plant and other structures. Company also plans addition to gasoline absorption plant in same district. Entire project will cost about $200,000 with equipment.

Bogalusa Paper Co., Inc., Bogalusa, La., manufacturer of kraft paper stocks, plans one-story addition to mill to increase capacity about 25 per cent. Work will include a new lime-burner unit, diffuser equipment for mechanical pulp-washing division, caustic fluid production equipment and other expansion. Cost about $400,000. Company is affiliated with Gaylord Container Corp., St. Louis

United States Engineer Office, Vicksburg, Miss., asks bids until Aug. 17 for one complete dredge pump primer (Circular 14); until Aug. 18, two motor-driven vertical centrifugal pumps, with motors, motor controls and controller spare parts; one similar type motor-driven

(CONTINUED ON PAGE 128)

"MAXI" TAP WINS!

JUMPS PRODUCTION 2900%

Pennsylvania Plant Standardizes on "Maxi"

THIS JOB IS TOUGH! IT BREAKS TAPS LIKE MATCHES.
WHAT'S THE MATTER HERE? ONLY A HUNDRED PIECES A DAY. WE GOTTA DO BETTER THAN THAT!
SEND OVER SOME OF THOSE "MAXI" TAPS YOU'VE BRAGGED ABOUT. WE'VE A REAL TEST FOR THEM.
TRY THIS "MAXI" TAP. IT'S SUPPOSED TO BE GOOD!
SURE . . . I'VE HEARD THAT BEFORE.
HEY, BOSS! WE'VE GOT THE JOB LICKED! 3,000 PIECES AND THAT "MAXI" TAP IS STILL GOING STRONG.
THOSE "MAXI" TAPS ARE SWELL. THEY INCREASED PRODUCTION 2900%. WHAT'S IN 'EM?
IT'S "GREENFIELD'S" SPECIAL SURFACE TREATMENT.

Maxi (they're Black) *Tools*

Remember that all *"Greenfield"* high speed steel taps, reamers and twist drills may be had with "Maxi" surface treatment. They will boost production and lower costs.

GREENFIELD TAP & DIE CORPORATION
GREENFIELD, MASSACHUSETTS
Detroit Plant: 2102 West Fort Street
Warehouses in New York and Chicago
In Canada: Greenfield Tap & Die Corp. of Canada, Ltd., Galt, Ont.

GREENFIELD

THEY PAY THEIR OWN WAY

CASE STUDY No. 167

Name of Company [redacted] *

Address [redacted]

Number and rating of National Acme Screw Machines on this job 2 3½-inch Model R-4 spindles

Name of parts being produced Drive pulley for refrigerator V belt

Production rate Higher than estimates

Down time Negligible

Finish and accuracy Excellent-concentricity extremely good, which means an elimination of vibration

Maintenance cost Negligible

Are secondary operations eliminated? Yes-on shaving groove for finish

Other advantages of National Acme machines on this job. This part was formerly a casting. It is now made better and cheaper on these automatics.

How long will it take the new machines to pay for the original investment? Approximately one year

Signed W. D. J.

*NAME ON REQUEST

Automatic Screw Machines
Dies and Taps
Positive Centrifuges
The Chromelog
Contract Manufacturing

NATIONAL

Refrigerator Manufacturer Saves With New Acme-Gridley Screw Machines

Want greater production? Lower production costs? You can achieve those results with our new Model R National Acme Automatic Screw Machines. That's what a refrigerator manufacturer did (see opposite page.) That's what dozens of other companies are doing today.

We have made amazing improvements in our automatics in the last few years. Improvements so great that they obsolete machines that are comparatively young.

The new models are high-speed heavy machines with little or no vibration. Power is increased. Indexing is faster. Secondary operations are eliminated. More accurate finishes are possible.

No wonder huge savings are made. No wonder this refrigerator manufacturer says the new machines will pay for themselves in a year.

Why not let one of our engineers look over your equipment—give you dollars-and-cents estimates of costs and savings?

The National Acme Company, *Cleveland, Ohio*

What Is the Chronolog?

The Chronolog is the only instrument that keeps a running record of idle and productive time, and a count of pieces on the job—and prints this data on a chart that may be read as easily as a typewritten report. By showing reasons for down time it points the way to their correction. Write for bulletins.

ACME

GRIDLEY AUTOMATICS

(CONTINUED FROM PAGE 124)

pump for cooler service; and one similar type centrifugal pump for electrolyte service (Circular 15).

SOUTHWEST

Keasbey & Mattison Co., Butler Avenue, Ambler, Pa., manufacturer of corrugated asbestos-cement roofing, siding, pipe insulation, etc., plans new branch plant at St. Louis, where site is being selected. Cost close to $500,000 with machinery.

Wackman Welded Ware Co., 2412 South Seventh Street, St. Louis, manufacturer of steel tanks, drums and kindred equipment, has let general contract to W. T. Miller, North Kansas City, Mo., for one-story addition to branch plant at North Kansas City. Cost over $45,000 with equipment.

H. M. Barney, Texarkana, Ark., is at head of project to build carbon black producing plant in Miller County, Ark., with gas compressor and control stations, storage and distributing buildings, power house and other structures. Cost close to $300,000 with machinery.

Rogers Iron Works, Third and Railroad Streets, Joplin, Mo., has let structural steel contract to Ozark Engineering Co., Joplin, for one-story foundry, 35 x 50 ft.

Pyramid Mfg. Co., Houston, Tex., manufacturer of water heaters and parts, water-treatment equipment, etc., has leased one-story building at 1112-14 Wood Street for new plant.

City Council, El Paso, Tex., plans new municipal airport on tract recently selected, including several hangar units, with repair and reconditioning shops, oil storage and distributing building and other mechanical structures. Fund of $237,000 has been arranged. Present airport site will be abandoned.

Consolidated Chemical Industries, Inc., Houston, Tex., has approved plans for three-story branch plant on Denton Road, Fort Worth, Tex., 60 x 120 ft., primarily for acid production. Other units will be built later. Entire plant will cost close to $200,000 with equipment.

WESTERN PA. DIST.

McCrady-Rodgers Co., 239 Fourth Avenue, Pittsburgh, building materials and supplies, has acquired waterfront property on Allegheny River, near Oakmont, Pa., for new river-rail-truck terminal, to include stiff-leg derrick and other mechanical-handling equipment for unloading barges, storage bins for sand and gravel, conveyers, loaders and other equipment.

Speer Carbon Co., St. Marys, Pa., manufacturer of carbon electrodes, plates, etc., has asked bids on general contract for one-story addition, 80 x 180 ft. Cost over $50,000 with equipment. Structural steel award has been let to Rogers Structural Steel Co., Corry, Pa.

National Biscuit Co., 449 West Fourteenth Street, New York, has leased one-story building, 85 x 100 ft., to be erected at Twentieth Street and Seventh Avenue, Huntington, W. Va., for new factory branch, storage and distributing plant. Cost about $50,000 with mechanical-handling equipment.

OHIO AND INDIANA

Vulcan Copper & Supply Co., 120 Sycamore Street, Cincinnati, manufacturer of copper products, chemical equipment, etc., has asked bids on general contract for one-story addition, 38 x 165 ft., primarily for storage and distribution. Cost close to $40,000 with equipment.

Premier Rubber Mfg. Co., Edmund Street, Dayton, Ohio, manufacturer of molded rubber products, has let general contract to B. G. Danis Co., Dayton, for two-story L-shaped addition, 85 x 127 ft. Cost close to $80,000 with equipment. Geyer & Neuffer, Ludlow Arcade Building, are architects.

Wellman Bronze & Aluminum Co., 6017 Superior Avenue, Cleveland, manufacturer of castings, bearings, bushings, etc., has arranged for sale of 22,000 shares of stock, to total about $159,500, part of proceeds to be used for plant additions and equipment.

State Department of Education, Capitol Building, Columbus, Ohio, plans extensions and improvements in power plant at Miami University, Oxford, Ohio, including new 1500-hp. boiler unit, stoker and auxiliary equipment. Cost about $50,000. Fosdick & Hilmer, Union Trust Building, Cincinnati, are consulting engineers.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Aug. 16 for one airless blast unit and one conveyor and elevator (Circular 61), tube benders and three stands (Circular 58), two hydraulic pumps (Circular 57); until Aug. 19, flotation gear brackets, flotation bag container attachment plates, flotation bag release assembly shims, flotation bag container washers, flotation bag container cover release links and release lugs, flotation bag container cover release rod guards and flotation bag attaching angle assemblies, etc. (Circular 54); until Aug. 20, 944 steel wire brushes and 6064 wire brush wheels (Circular 62).

Columbia Products Co., Columbia City, Ind., recently formed to manufacture metal goods, has let general contract to Fred O. Carey, South Whitley, Ind., for one-story plant, 100 x 300 ft. Cost close to $60,000 with equipment. Leroy Bradley, 221 West Wayne Street, Fort Wayne, Ind., is architect.

MICHIGAN DISTRICT

Detrola Corp., 1501 Beard Street, Detroit, operating Detrola Radio & Television Corp., and Detrola Refrigeration Corp., same address, manufacturers of radio equipment and parts, and electric refrigeration equipment, respectively, is arranging for sale of 150,000 shares of common stock, to total about $1,000,000, part of proceeds to be used for plant expansion and equipment.

Detroit Paper Products Co., 5800 Domine Street, Detroit, will modernize and expand former mill of Western Board & Paper Co., Kalamazoo, Mich., recently acquired for new plant for production of special type of paper board. New equipment will be installed and beater room and other divisions electrified. Cost about $300,000 with machinery.

Fisher Body Corp., General Motors Building, Detroit, a division of General Motors Corp., has let general contract to J. A. Utley, 6031 Mansur Street, for one-story addition to plant No. 1, Flint, Mich., totaling about 175,000 sq. ft. of floor space, for a press and die shop. Cost about $250,000 with equipment.

American Forging & Socket Co., Pontiac, Mich., has awarded contract for an addition, according to W. S. Saunders, president. New building will provide approximately 20,000 sq. ft. of additional space at a cost, including equipment, of about $150,000.

MIDDLE WEST

John R. McGregor Lead Co., 4520 West Fifteenth Street, Chicago, recently organized by John R. McGregor, formerly first vice-president of Eagle Picher Lead Co., Cincinnati, and associates, has acquired property at first noted location for new one and one-half story plant, 150 x 250 ft., for manufacture of lead products. Cost close to $100,000 with equipment.

Commanding Officer, Ordnance Department, Rock Island Arsenal, Rock Island, Ill., asks bids until Aug. 16 for motor parts, including gears, shafts, springs, rods, rings, etc. (Circular 77), 40 speedometer shafts and casings, 40 tachometer shafts and 10 speedometers (Circular 80), one constant temperature cabinet (Circular 40), engine parts, including starter and generator shields (Circular 81); until Aug. 17, one set of tools for servicing and overhauling magnetos (Circular 75), flexible shielded commercial conduit and armored flexible shielded conduit (Circular 72), galvanized steel or bronze flexible metal tubing and swivel couplings (Circular 71), 225 input shafts, 100 reverse idler drive shaft bearing rings, 200 output shaft rings, 50 oil pump bodies (Circular 73); until Aug. 18, two tool and cutter grinders (Circular 60), one 72-in. rotary table sandblast (Circular 63), two hydraulic portable tables (Circular 61), two heavy-duty, elevating platform electric trucks (Circular 76); until Aug. 19, one precision locating and jig boring machine (Circular 62); until Aug. 20, one precision surface grinder with hydraulic feeds (Circular 67), one 20-in. hydraulic shaper (Circular 66), one centerless grinding machine (Circular 65).

International Harvester Co., 606 South Michigan Avenue, Chicago, has let general contract to Lippert Construction Co., Boone, Iowa, for one-story addition to branch plant at Fort Dodge, Iowa. Cost about $55,000 with equipment.

Common Council, Indianola, Iowa, asks bids until Aug. 23 for extensions and improvements in municipal electric power plant, including new 750-bhp. diesel engine-generator unit and auxiliary equipment.

Spring City Foundry Co., 901 West St. Paul Avenue, Waukesha, Wis., is taking estimates for new core room and pattern storage house. William J. Grede, president, Liberty Foundry Co., 6432 West State Street, Milwaukee, is in charge.

Robbins Flooring Co., Rhinelander, Wis., has placed general contract with C. R. Meyer & Sons Co., 50 State Street, Oshkosh, Wis., for hardwood flooring factory, dry kilns, etc., at Newberry, Mich., to cost $175,000 with equipment. Paul Abendroth is local manager at Newberry.

Sheboygan Foundry Co., Sheboygan, Wis., has plans by Satre & Senescell, local architects, for shop addition, 50 x 80 ft.

Chippewa Power Co-Operative, Walter Leonard, Ellsworth, Wis., secretary, closes bids Aug. 16 for rural electrical diesel generating power plant four miles north of Chippewa Falls. Banister Engineering Co., Third and Walnut Streets, Hudson, Wis., is designer.

PACIFIC COAST

Douglas Aircraft Co., 3000 Ocean Park Boulevard, Santa Monica, Cal., has let structural steel contract to Western Pipe & Steel Co., 5717 Santa Fe Avenue, Los Angeles, for assembling unit, 200 x 600 ft., with mezzanine floor of about 12,000 sq. ft. Cost over $300,000 with equipment. Edward C. and Ellis W. Taylor, 803 West Third Street, Los Angeles, are architects and engineers.

Cornell Tractor Co., Salinas, Cal., manufacturer of farm tractors and parts, has let general contract to E. F. Reese, 417 Lincoln Avenue, Salinas, Cal., for one-story addition. Cost about $35,000 with equipment. A. W. Story, Pajaro Valley Bank Building, Watsonville, Cal., is architect.

Luer Packing Co., 3026 East Vernon Avenue, Los Angeles, meat packer, has let general contract to Austin Co. of California, 777 East Washington Boulevard, for three-story addition. Cost close to $90,000 with equipment. Boyd I. Means, 5905 Pacific Boulevard, Huntington Park, Cal., is engineer.

Washington Iron Works, 1500 Sixth Avenue South, Seattle, has plans for one-story addition, 80 x 117 ft., for storage and distribution. Cost close to $40,000 with equipment. Cyril A. Costello, 6211 Twenty-first Street, N.E., is architect.

Inland Power & Light Co., Public Service Building, Portland, Ore., plans addition to hydroelectric generating plant on Crooked River, near Cove, Ore., including hydraulic turbine unit, generator and auxiliary equipment, headgates, new diversion dam and other structures. Extensions will be made in transmission lines. Cost over $250,000.

Berkeley Unified School District, Berkeley, Cal., will take bids soon on general contract for one-story vocational shop at Berkeley high school, Grove and Kittredge Streets. Cost about $150,000 with equipment. Will G. Corlett, Bank of America Building, Oakland, Cal., and H. H. Gutterson, 520 Powell Street, San Francisco, are architects.

Clearwater Valley Light & Power Association, 1206 Main Street, Lewiston, Idaho, plans steam-electric generating plant at Kendrick, Idaho, for rural electrification system. Cost about $75,000. Entire project will cost $400,000. T. C. Smith is chief engineer.

FOREIGN

W. & T. Avery, Ltd., Soho Foundry, Birmingham, England, manufacturer of iron and steel castings, plans one-story addition for new foundry unit, and modernization and improvements in present plant. Cost close to $500,000 with equipment.

Ormiston Rubber Co., Pty., Ltd., Melbourne, Victoria, Australia, recently organized, has acquired property on Mount Alexander Road, Moonee Ponds, Melbourne, improved with several one-story buildings, and will remodel for production of line of rubber specialties. Cost close to $100,000 with machinery. G. and C. P. Ormiston head new company.

A HINT OF *Efficiency*

★ ★ ★ ★ ★ ★

FROM chemical, metallurgical and physical analysis of raw material as it comes from the steel mill to the shipment of the finished products packed in cases and kegs—LAMSON bolts and nuts receive a highly specialized attention that means much to our customers.

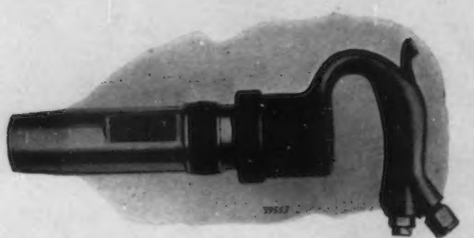
Five large and modern plants are equipped with the most modern production machines built today. Complete heat treating and plating departments are operated. An engineering staff works with our customers' engineers in developing fastenings for special purposes—and continually keeps an alert eye on possibilities for improvement of standard products. Complete conveyor equipment all through our plants speeds deliveries to you.

Devoted to producing fastenings, LAMSON & SESSIONS is today the manufacturer of the most complete line of bolt and nut products in this country. The advantages of purchasing your fastenings of all kinds . . . on one bill of lading . . . on one invoice . . . with less inside handling, less confusion, less bookkeeping, lower shipping costs . . . are an obvious economy of time, effort and expense. You can buy all of your fastenings from this one dependable source. THE LAMSON & SESSIONS COMPANY, General Offices, Cleveland, Ohio. Plants at Cleveland and Kent, Ohio; Chicago and Birmingham.

Your Jobber stocks the LAMSON Line

LAMSON & SESSIONS

THEY ALL USE I-R BILLET CHIPPERS



SIZE 300 CHIPPING HAMMER

This "flapper-valve" hammer is the size recommended for use on heavy steel castings and low carbon and alloy steel billets.

I-R Pneumatic Tools include Chippers, Grinders, Hoists, Rammers, Riveters, Drills and Reamers, Core Breakers, Scalers and Wire Brushes. A complete line of high quality accessories is also available.

I-R CHIPPERS are powerful, high-speed tools. They are easy to hold and their upkeep cost is low.

They are built from specially treated materials and are equipped with the famous I-R "flapper-valve" which is self-seating and practically indestructible.

That's why you see I-R CHIPPERS all down the billet line in the majority of large steel mills. That's why steel mill officials everywhere are rapidly turning to this handy, lightweight tool to better handle their billet chipping problems.

If you are not already familiar with I-R chipping hammers, be sure to phone, wire or write our nearest office for information, or ask one of our men to call.

Atlanta
Birmingham
Boston
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Butte
Chicago
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Dallas
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Duluth
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WHAT DO YOU CARBURIZE?

IF YOUR carburizing requirements call for exceptional wear resistance plus good core properties—you can save money by standardizing on Chrome-Molybdenum carburizing steel.

This new carburizing steel has been developed as an answer to insistent demands for greater production economy in the face of rising costs.

It carburizes under ordinary shop conditions with minimum, uniform distortion. It takes a very hard, wear-resistant case. It develops good core properties. It anneals to quick machining hardness. And—it costs less than any other existing successful alloy carburizing steel.

Chrome-Moly has already solved some difficult problems. It is being used for a wide variety of applications. It will pay to investigate it fully—as an effective means of cutting your carburizing costs. We will gladly furnish complete details. Climax Molybdenum Company, 500 Fifth Avenue, New York City.

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MOLY

LUDLOW-SAYLOR WIRE CO.
600-616 S. Newstead Ave.
St. Louis, Mo.

Please send us Book No. 48-W "Getting Results."

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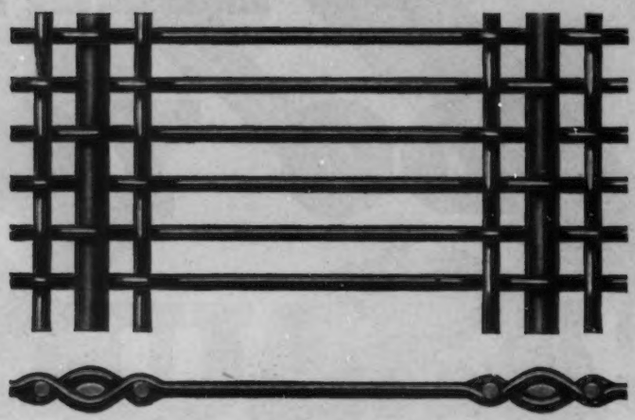
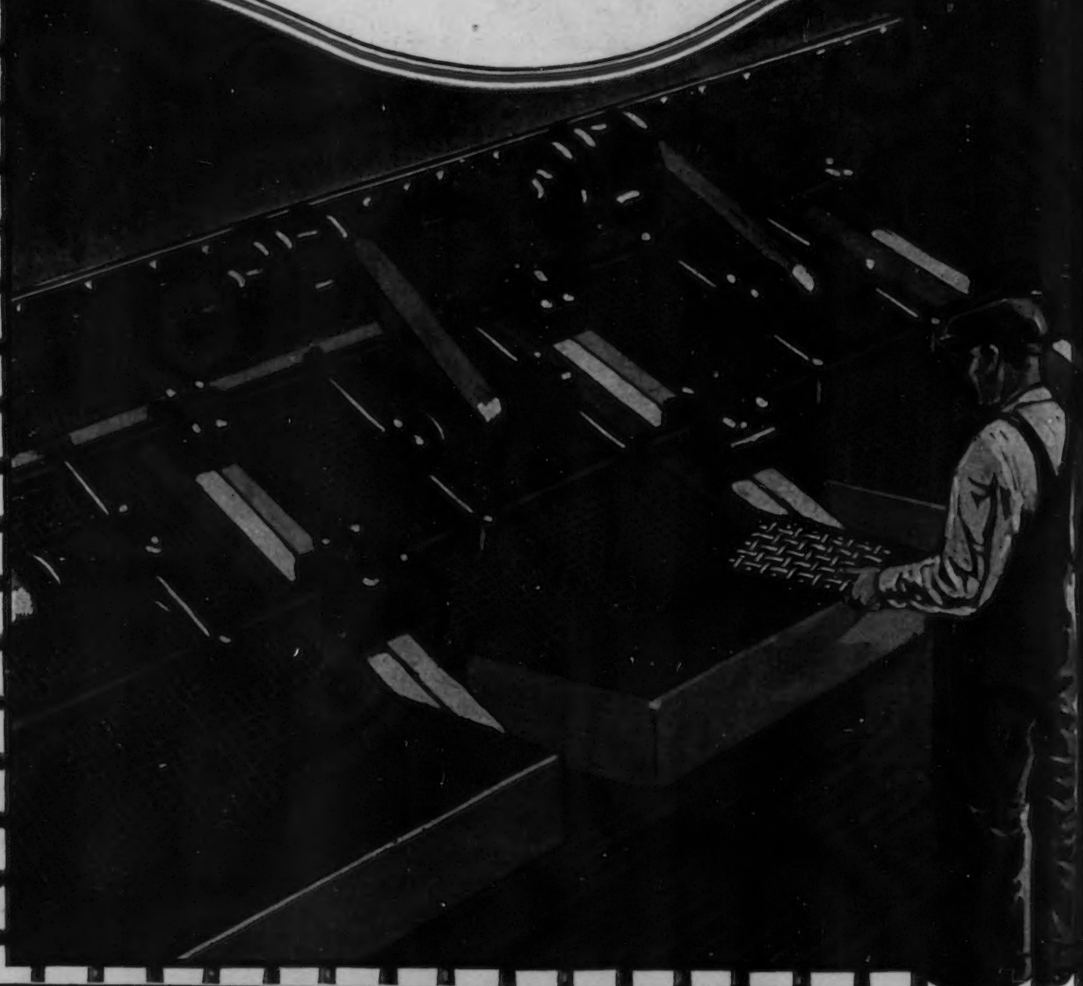
SQUARE MESH and LONG-SLOT

WOVEN WIRE SCREENS
FOR ALL PURPOSES



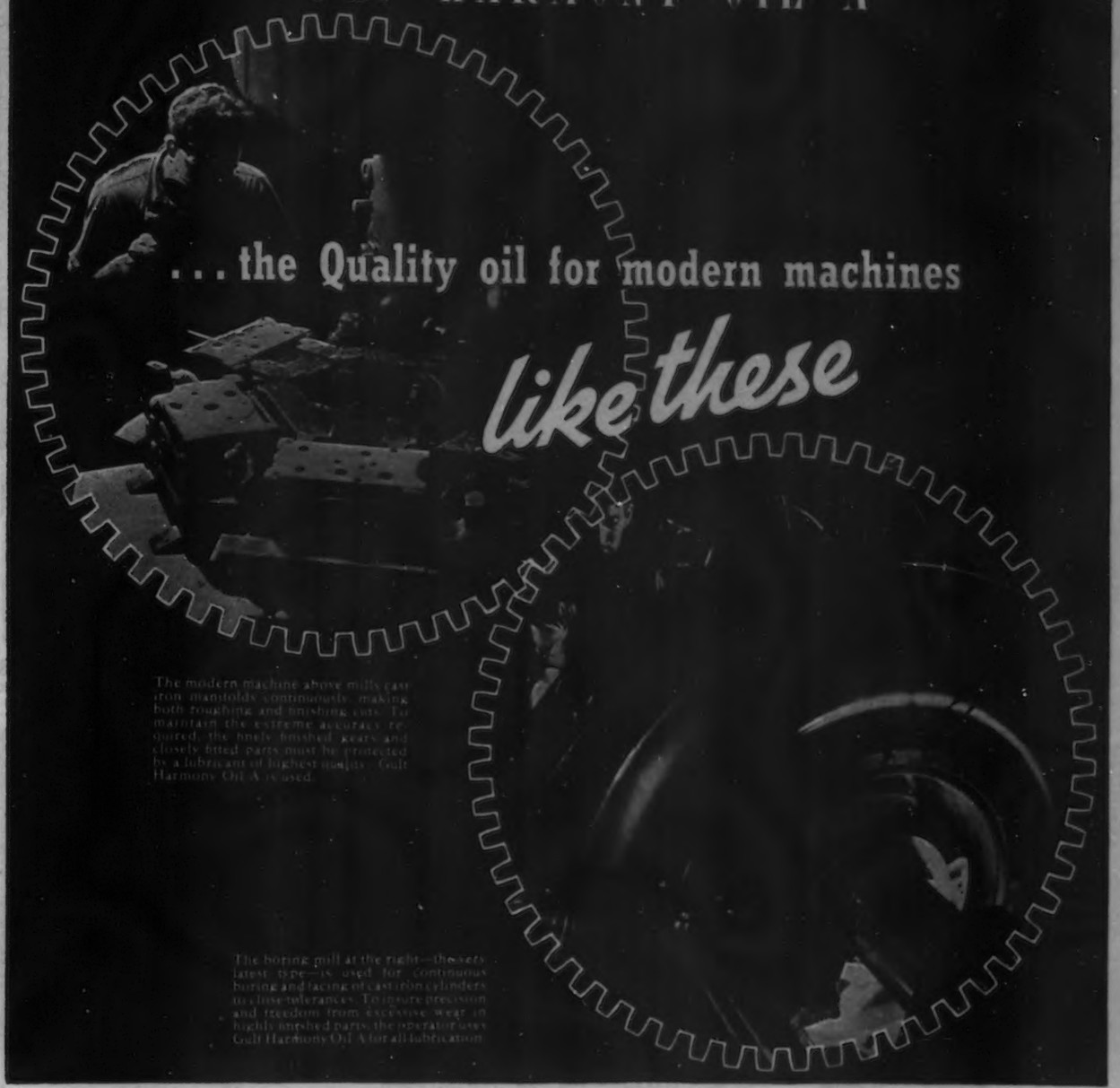
See the New Sta-Tru Long-Mesh Screen.
Samples of various weaves, metals, etc., will be furnished on request



The LUDLOW-SAYLOR WIRE COMPANY ST. LOUIS
600-616 S. NEWSTEAD AVE.

GULF HARMONY OIL A

. . . the Quality oil for modern machines *like these*



The modern machine above mills cast iron manifolds continuously, making both roughing and finishing cuts. To maintain the extreme accuracy required, the finely finished gears and closely fitted parts must be protected by a lubricant of highest quality. Gulf Harmony Oil A is used.

The boring mill at the right—the latest type—is used for continuous boring and facing of cast iron cylinders to close tolerances. To ensure precision and freedom from excessive wear in highly finished parts, the operator uses Gulf Harmony Oil A for all lubrication.

FINELY finished parts built with close tolerances—as in the modern machine tools shown above—need the protection of the highest quality oil to insure accurate work and a high rate of production.

In the circulating oil systems of such machines as these, Gulf Harmony Oil A—treated by the finest of the new special refining processes—gives outstanding service. It amply provides for high speeds and severe operating conditions.

No matter what type of machinery you operate, there is a Gulf lubricant exactly suited to each bearing, gear and moving part. The Gulf line comprises more than 400 quality oils and greases, and a Gulf engineer—thoroughly trained and experienced with machinery similar to yours—is prepared to give you the kind of lubrication counsel which will save you money. Write us, suggesting a time when he may call. You will not be obligated in any way.

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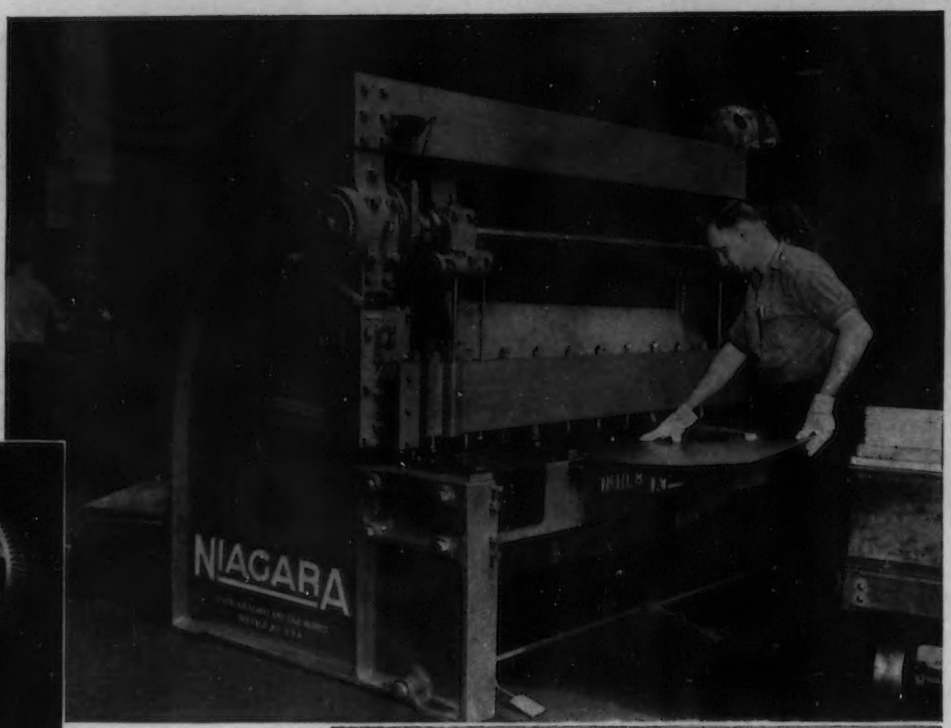
GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.

Why MEN in the METAL WORKING INDUSTRY O K NIAGARA PRESSES & SHEARS

More strokes per hour, convenient and safer operation, strength and rigidity for accurate production and long die life, minimum maintenance cost . . . those are a few of the many reasons why the Metal Working industry is depending on Niagara Presses and Shears.



ABOVE: *Niagara Series HL Power Squaring Shear in action in one of America's largest automotive manufactories.*

LEFT: *One of the complete line of Niagara Master Series A inclinable Presses built in sizes from 1¼" to 5½" Diameter Shafts.*

Their many features are illustrated in Niagara Bulletins showing the latest developments in Presses and Shears—write for your personal copy.

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CROSBY *for* STAMPINGS

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What does it do?

Gives you more hours of *executive* time by cutting routine almost unbelievably. Your daily mail, for instance, is cleaned up in about half the time it now requires.

Takes the up-set out of vacation season. Work goes on smoothly regardless of absences. Pressure ceases, confusion disappears . . . *and all hands get more done!*

Lets your secretary cease to be just a shorthand machine, and get more real work done. While you dictate, she goes right on *keeping things moving for you!*

Helps many big ways you'd never think of until you *see* them. Records phone calls while they happen . . . makes verbal instructions alibi-proof . . . cuts conferences . . . *doubles your ability to get things done!*

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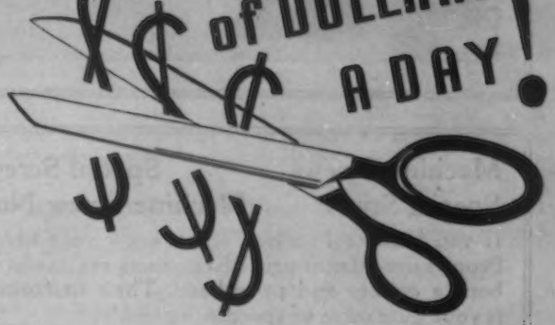
The word DICTAPHONE is the Registered Trade-Mark of Dictaphone Corporation, Makers of Dictating Machines and Accessories to which said Trade-Mark is Applied.

How *This* Cement CUTS LOSSES of THOUSANDS of DOLLARS A DAY!



Production suspended while cement is setting is costly business.

The value of a cement that sets at once must be reckoned in terms far beyond the price of so many hundred lbs. of material.

Tegul-VITROBOND sets in *less than five minutes* — without treatment with water or chemicals.

So far as the cement is concerned, the acid-proof unit is ready for use immediately.

Tegul-VITROBOND is impervious to all industrial acids, *including hydrofluoric*, used in pickling stainless steel.

Our Technical Division will submit recommendations, plans and estimates — without cost to you.

Use Tegul-VITROBOND for

Casting Foundations for Engines and other heavy machinery : Foundations for Acid Towers and Brickwork in acid-soaked ground : Tanks, Sewers, Drains and Pits for acid wastes : Write us about your *problem* in acid-proof construction or replacement.

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The **ATLAS MINERAL Products Co.**
of Pennsylvania
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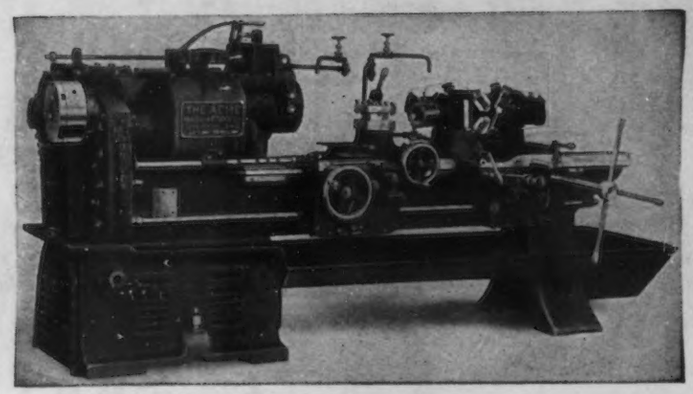
Tegul-VITROBOND

The Improved Sulphur Cement

TANKS · FLOORS · WASTE PITS · DRAINS · SEWERS



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Universal Turret Lathes

Designed and built for high production

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Alloy steel sliding gears in head.
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Cincinnati, Ohio

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Do you know about the savings made possible by our special heading process? Better get in touch with us.

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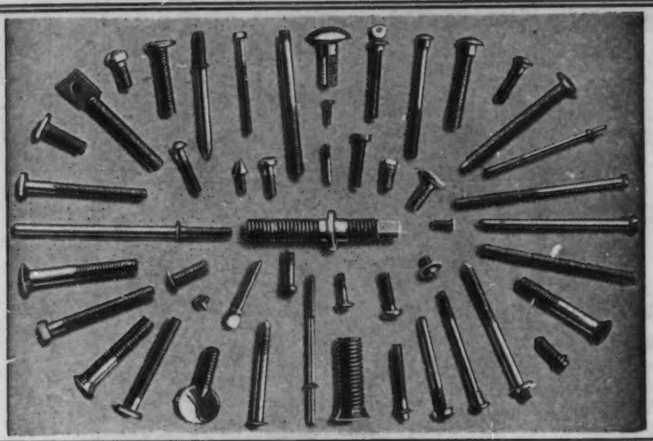

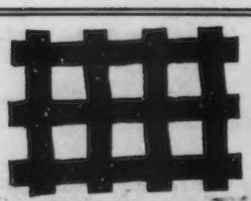

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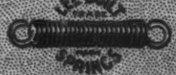

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Hill Chase & Co.—Richmond and Ontario Sts., Philadelphia, Pa.
Wetherell Bros. Co.—251 Albany St., Cambridge, Mass.

Products Index

ABRASIVE WHEELS — See Grinding Wheels

ABRASIVE CLOTH & PAPER
Norton Co., Worchester, Mass.

ABRASIVES—Steel Shot and Grit
Pangborn Corporation, Hagerstown, Md.

ACCESSORIES—Welding
Lincoln Electric Co., The, Cleveland.

ACCUMULATORS—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Hydraulik Gmbh. Duisburg, Germany.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Wood, R. D., & Co., Philadelphia.

ACETYLENE—Dissolved in Cylinders & Small Tanks
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

ACID-PROOF CEMENT
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

ACID-PROOF CONSTRUCTION
Atlas Mineral Prods. Co. of Pa., The, Mertztown, Pa.

ACIDS—Pickling
American Chemical Paint Co., Ambler, Pa.
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

AIR CONDITIONING EQUIPMENT
American Blower Corp., 6000 Russell St., Detroit

AIR TANKS AND CYLINDERS
Petroleum Iron Works Co., The, Sharon, Pa.
Scaife, William B., & Sons Co., Pgh.

ALLOYS—Copper
American Brass Co., The, Waterbury, Conn.

ALLOYS—Ferro
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Magnesium
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

ALLOYS—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.
Riverside (N. J.) Metal Co.

ALLOYS—Resistance Welding
Electroloy Co., Inc., 50 Church St., New York City.

ALLOYS—Titanium
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

ALLOYS—Tungsten
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS—Vanadium
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS—Zinc Base Die Casting
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ALUMINUM
Aluminum Co. of America, Pittsburgh.
Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

AMMETERS AND VOLTMETERS—Recording
Leeds & Northrup Co., Philadelphia.

AMMONIA RECOVERY PLANTS
Koppers Co., Pittsburgh.

ANGLES, BEAMS, CHANNELS AND TEES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Ryerson, Jos. T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago
Steel & Tubes, Inc., Cleveland.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.

ANGLES, BEAMS, CHANNELS & TEES —Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

ANNEALING—See Heat Treating

ANNEALING BOXES
Lebanon (Pa.) Steel Foundry.
Petroleum Iron Works Co., The, Sharon, Pa.
United Engineering & Fdry. Co., Pgh.

ANNEALING COVERS
Petroleum Iron Works Co., The, Sharon, Pa.
Surface Combustion Corp., 2375 Dorr St., Toledo.

ANODES—All Types
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Seymour (Conn.) Mfg. Co.
Udylite Co., The, Detroit.

ANODES—Cadmium
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Udylite Co., The, Detroit.

APPAREL—Welding
Lincoln Electric Co., The, Cleveland.

ARBORS
Cincinnati (Ohio) Milling Mch. Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

ARMORING MACHINERY—Cable, Wire, Hose
Sleeper & Hartley, Inc., Worcester, Mass.

ARRESTERS—Spark
Harrington & King Perforating Co., Chicago.

ASBESTOS
Carey, Philip, Co., The, Cincinnati.

AXLES—Car or Locomotive
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

BALANCING EQUIPMENT
Cisholt Machine Co., Madison, Wis.

BALING PRESSES—Scrap — See Presses —Baling

BALLS—Burnishing
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Hartford (Conn.) Steel Ball Co., The.

BALLS—Steel, Brass or Bronze
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Hartford (Conn.) Steel Ball Co., The.
New Departure Div., General Motors Corp., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

BANDS—Steel
Acme Steel Co., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BANDS—Welded
Amer. Welding & Mfg. Co., Warren, O.

BARRELS—Burnishing
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Ransohoff, N., Inc., Cincinnati.

BARRELS—Tumbling
Baird Mch. Co., The, Bridgeport, Conn.
Hartford (Conn.) Steel Ball Co., The.
Ransohoff, N., Inc., Cincinnati.
Whiting Corp., Harvey, Ill.

BARS—Alloy
Republic Steel Corp., Cleveland, Ohio.

BARS—Aluminum
Aluminum Co. of America, Pittsburgh.

BARS—Brass, Bronze or Copper
Bunting Brass & Bronze Co., Toledo, Ohio.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BARS—Cold Drawn
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

BARS—Concrete, Reinforcing
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Jones & Laughlin Steel Corp., Pittsburgh.
Laclede Steel Co., St. Louis, Mo.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BARS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

BARS—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

BARS—Steel
Ames, W., & Co., Jersey City, N. J.
Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Steel & Tubes, Inc., Cleveland.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

BATTERIES—Storage
Electric Storage Battery Co., The, Phila.

BATTERY CHARGERS
Cutler-Hammer, Inc., Milwaukee.

BEAMS—See Angles, Beams, Channels and Tees

BEARINGS—Babbitt
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BEARINGS—Ball
Bantam Bearings Corp., The, South Bend, Indiana.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., Poughkeepsie, N. Y.

JUST BETWEEN US TWO

Surprise!

THAT entertaining yarn, *"Hammered Steel,"* in the July 31 *Satevepost*, was written by none other than our old friend Raymond A. Millholland of the Millholland Sales & Engineering Co., Indianapolis, whose contributions have graced these pages.

While hash to a member of the intelligentsia like yourself, his revelation that high speed steel is stronger hot than cold is caviar to the general.

Housewife's Delight

CHARLES A. PIERSON, of The Standard Electric Stove Co., Toledo, sends us a snapshot of Mrs. Pierson reading The Iron Age. It isn't, he tells us, a gag. She makes him bring up The Iron Age each week so that she can read, *"This Week in Washington."* That brings our Washington editor's—L. W. Moffett—"Moff" to you—audience up to 70,000 men and two women. Mrs. MacEnally of Cleveland reads it, too.

Puzzle

GEORGE R. WOODS, who was with us when this column had only a lowly trio of readers—him, us and the proofreader—instead of the present lordly eighteen, postcards:

"Just flew back from Germany. H.W.T.W.Y.W.H. S.M.M.R."

It's all Greek to us. All we can make of it is, *"Here's where the whey you want has xanthous microcosms moiling rabidly."* Come clean, George. Did we guess it?

One Ump Shy, Sezzee

"SLOPPY reporting," is what George Appel, of Witte & Burden, Detroit, says of the item we ran here regarding our subscriber, the Bump Pump Co., La Crosse, Wis.

He flays us for not finding out what kind of pumps they make, as his ear would be soothed no end if a lullaby could be written about the steady tump tump of a Bump sump pump.

Honey With a Dash of Vinegar

FRANK HERZOG, an American engineer in the giant steel plant at Sverdlovsk, U.S.S.R., hurls a few long-distance minor cabbages and major orchids, including this:

"Was especially pleased at the addition of Juraschek to your staff, whose articles are of much help. The Russian engineers have also commented on them."

He refers, of course, to Frank Juraschek's twin series on industrial power transmission and materials handling. Pronounced *yoor'-a-shek.*

They Want the World to Know

WHILE the difficulty of establishing positive proof is conceded, the chances are ten to one that The Iron Age weekly editorial page establishes an all-time high for reader-interest in the business paper field.

Tremendous is a 16-cylinder word but it is gross understatement when applied to the attention the series is creating. Readers resent the fact that the audience reached is limited to the metalworking field. For instance, J. H. Selfridge of The Selfridge-Norton Mfg. Co., Cleveland roof flange manufacturer, writes:

"These editorials are so good and up to the minute with current events that we feel they should be passed along to business men who would have no reason to read a publication such as Iron Age."

He asks for a price on a thousand copies a week. We quoted him actual cost—$6.75.

Annual Frustration

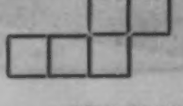
WE are gradually recovering from our annual two-weeks' rest and before long will be up to our usual low standard.

As we had in past years gazed enviously at those who received a daily fat envelope from the office, and an occasional telegram, giving them an opportunity to impress the other boarders, we left instructions to send us anything too complex for the help to handle.

But as usual nothing came. All we got was an insurance premium notice and a card from Aunt Minnie that she was sleeping under blankets in Maine. Next year we will address a dozen envelopes to ourselves, fill them with blank paper and have one mailed each day.

Problem

CREDIT yourself with uncommon acuteness if by replacing two of the matches you can change the five squares into four of the same size, with no matches left over.



—A.H.D.

"The Skyscraper by the Sea"

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to make The Claridge their home during their Annual Convention, October 18th to 22nd, 1937.

European Plan: Single from $4.00
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The Stevens Hotel offers the greatest amount of air-cooled area of all of the hotels in Chicago. Enjoy this crowning touch to the surpassing comfort, the pleasant living always found at the Stevens.

OTTO K. EITEL, *Managing Director*

Room, with Bath, from $3

Products Index

BEARINGS, Brass and Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Lawrenceville Bronze Co., Pittsburgh.
National Bearing Metals Corp., Pittsburgh.

BEARINGS—Oilless
Bunting Brass & Bronze Co., Toledo, O.
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.
Richardson Co., The, Melrose Park, Ill.

BEARINGS—Quill
Bantam Bearings Corp., The, South Bend, Indiana.

BEARINGS—Radial
Bantam Bearings Corp., The, South Bend, Indiana.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Roll Neck
Bantam Bearings Corp., The, South Bend, Indiana.
Morgan Construction Co., Worcester, Mass.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller
Bantam Bearings Corp., The, South Bend, Indiana.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Standard Machinery Co., Providence, R. I.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller Tapered
Bantam Bearings Corp., The, South Bend, Indiana.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Rolling Mill Equipment
Bantam Bearings Corp., The, South Bend, Indiana.
Richardson Co., The, Melrose Park, Ill.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Self-aligning Roller
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Shaft Hanger
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Thrust
Bantam Bearings Corp., The, South Bend, Indiana.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Timken Roller Bearing Co., The, Canton, O.

BELT DRESSING
Rhoads, J. E., & Sons, Philadelphia.

BELT LACING
Rhoads, J. E., & Sons, Philadelphia.

BELT—Conveyor, Elevator
Goodrich, B. F., Co., The, Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BELTING CEMENT
Rhoads, J. E., & Sons, Philadelphia.

BELTING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Rhoads, J. E., & Sons, Philadelphia.

BELTING—Metal, Conveyor, High and Low Temperature
Acme Steel Co., Chicago, Ill.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

BELTING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

BELTS—V-Type
Allis-Chalmers Mfg. Co., Milwaukee.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BENDING MACHINES—Hand, Band and Angle
Excelsior Tool & Mch. Co., E. St. Louis, Ill.

BENDING MACHINES—Hand and Power
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.
Kane & Roach, Inc., Syracuse, New York.
Niagara Machine & Tool Works, Buffalo, N. Y.

BENZOL RECOVERY PLANTS
Koppers Co., Pittsburgh.

BERYLLIUM COPPER
American Brass Co., The, Waterbury, Conn.
Riverside (N. J.) Metal Co.

BILLETS—Alloy Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Carbon Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Carbon Vanadium Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Chrome Nickel Steel
Andrews Steel Co., The, Newport, Ky.
Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Chrome Steel
Andrews Steel Co., The, Newport, Ky.
Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Die Block Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Forging
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.

BILLETS—Nickel Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Re-rolling
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.

BILLETS—Steel
Bethelhem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BIMETAL—Thermostatic
Chace, W. M., Co., 1605 Beard Ave., Detroit.

BINS—Rotating
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

BLANKS—Chisel
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Richardson Co., The, Melrose Park, Ill.

BLANKS—Gear, Silent Steel
Waldron, John, Corp., New Brunswick, N. J.

BLAST CLEANING EQUIPMENT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

BLAST FURNACES
Brassert, H. A., & Co., Chicago, Ill.

BLAST GATES
Rockwell, W. S., Co., 50 Church St., N.Y.C.

BLOCKS—Chain
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

BLOWERS
American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., 6000 Russell St., Detroit.
North American Mfg. Co., The, Cleveland.
Spencer Turbine Co., Hartford, Conn.

BLOWPIPES—Oxy-Acetylene Welding & Cutting
Linde Air Prods. Co., The, 30 E. 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

BLOWPIPES — Soldering, Heating, Annealing
American Gas Furnace Co., Elizabeth, N.J.
Torit Mfg. Co., St. Paul, Minn.
Weldit Acetylene Co., Detroit.

BOILERS
Munroe R., & Sons Mfg. Corp., Pittsburgh.

BOILERS—Waste Heat
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOILERS—Water Tube
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOLT CUTTERS
Landis Mch. Co., Inc., Waynesboro, Pa.

BOLT AND NUT MACHINERY
Ajax Mfg. Co., The, Euclid, Ohio.
Landis Machine Co., Inc., Waynesboro, Pa.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

BOLT & RIVET CLIPPERS
Bremil Mfg Co., Erie, Pa.
Helwig Mfg. Co., St. Paul, Minn.

BOLTS—Carriage and Machine
Cleveland (Ohio) Cap Screw Co., The
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

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Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS—Special, Hot or Cold Upset
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.

BOLTS—Stove
Blake & Johnson Co., The, Waterville, Ct.
Lamson & Sessions Co., The, Cleveland.

BOLTS—Track
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Lamson & Sessions Co., The, Cleveland.
Republic Steel Corp., Upson Nut Div., Cleveland, O.

BOLTS AND NUTS
Ames, W., & Co., Jersey City, N. J.
Clark Bros. Bolt Co., Milldale, Conn.
Erie (Pa.) Bolt & Nut Co.
Hein & Heiz, Inc., 33—34th St., Brooklyn, N. Y.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOND—Grinding Wheel
Bakelite Corp., 247 Park Ave., N. Y. C.

BOOTHS—Spray
DeVilbiss Co., The, Toledo, Ohio.

BORING BARS
Bullard Co., The, Bridgeport, Conn.

BORING, DRILLING & MILLING MACHINES—Horizontal
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
Lucas Machine Tool Co., Cleveland.
National Automatic Tool Co., Richmond Ind.

BORING & DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.
Bullard Co., The, Bridgeport, Conn.

BORING MACHINES—Diamond
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

BORING MACHINES—Diamond & Carbide Tools
Heald Mch. Co., Worcester, Mass.

BORING MACHINES—Jig
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

BORING & TURNING MILLS—Vertical
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Planer Co.
Rogers Machine Wks., Alfred, New York.

BOX STRAPPING
Acme Steel Co., Chicago, Ill.

BRAKE LINING AND BLOCKS—Asbestos
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

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BRAKES—Electric & Mechanical
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Electric Controller & Mfg. Co., The, Cleveland.

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Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

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Dreis & Krump Mfg. Co., Chicago.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Steelweld Machinery Co., Cleveland.

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BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

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Belmont Iron Works, Philadelphia.

BRIDGE OPERATING MACHINERY—Movable
Earle Gear & Mch. Co., Philadelphia.

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Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

BROACHING MACHINES
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Cincinnati (Ohio) Milling Mch. Co., The.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

BRONZE FOR DIES
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BRONZE—Phosphor
Bunting Brass & Bronze Co., Toledo, Ohio.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

BRUSHES—Machine
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BRUSHES—Wire
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

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Hayward Co., The, 50 Church St., N. Y. C.
Industrial Brownhoist Corp., Bay City, Mich.

BUCKETS—Electric Motor
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Elevator
Jeffrey Mfg. Co., The, Columbus, Ohio.

BUCKETS—Orange Peel
Hayward Co., The, 50 Church St., N. Y. C.

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Vonnegut Moulder Corp., 1807 Madison Ave., Indianapolis, Ind.

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Iron & Steel Products, Inc., Chicago.

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Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Steelweld Machinery Co., Cleveland.

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Phosphor Bronze Smelting Co., The, Phila.

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Udylite Co., The, Detroit.

CADMIUM PLATING PROCESS
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Udylite Co., The, Detroit.

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CARBIDE
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

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Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.
Hoskins Mfg. Co., Detroit Mich.
Lebanon (Pa.) Steel Foundry.
Midvale Co., The, Nicetown, Phila., Pa.
Meehanite Metal Corp., Pittsburgh.

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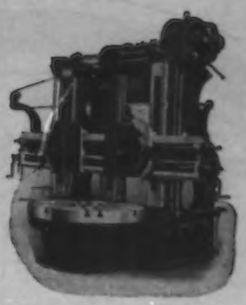
Dodge Steel Co., Philadelphia, Pa.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.



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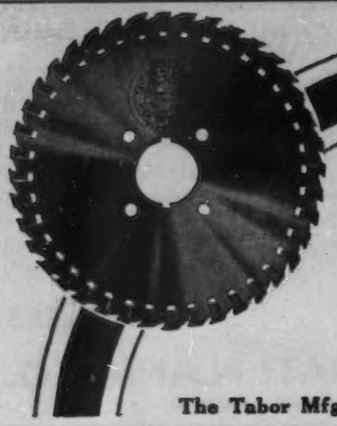

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Spencer's, I. S., Sons, Inc., Guilford, Ct.

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National Roll & Fdry. Co., Avonmore, Pa.
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Spencer's, I. S., Sons, Inc., Guilford, Ct.

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Pennsylvania Salt Mfg. Co., Phila., Pa.

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Medart Co., The, St. Louis, Mo.
Morse Chain Co., Ithaca, New York.

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Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

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Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

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Fairbanks, Morse & Co., Chicago.
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Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Electric Hoist & Motor Co., 149 N. 9th St., Bklyn., N. Y.
Euclid Crane & Hoist Co., The, Euclid, O.
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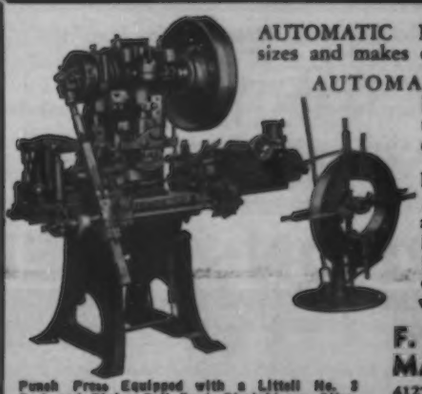

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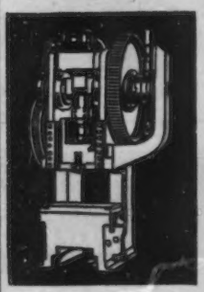

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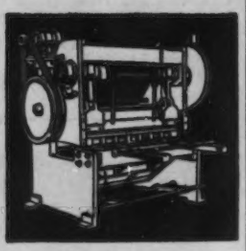

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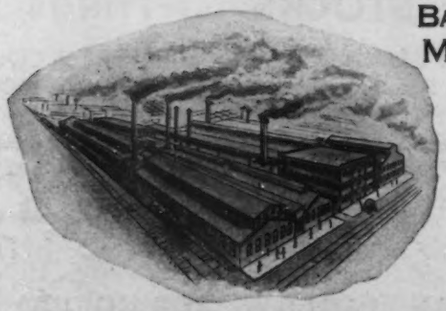

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FURNACES—Enameling
Carborundum Co., The, Perth Amboy, N. J.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Forging
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Heat Treating, Automatic
Amer. Gas Furnace Co., Elizabeth, N. J.
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Holcroft & Co., Detroit.
Leeds & Northrup Co., Philadelphia.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Heat Treating, Cyanide of Lead
Chicago (Ill.) Flexible Shaft Co.
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FURNACES—Heat Treating, Electric
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Leeds & Northrup Co., Philadelphia.
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Rockwell, W. S., Co., 50 Church St., N.Y.C.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FURNACES—Heat Treating, Oil or Gas
Chicago (Ill.) Flexible Shaft Co.
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Holcroft & Co., Detroit.
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Rockwell, W. S., Co., 50 Church St., N.Y.C.
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FURNACES—Pack Heating Sheets
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Wean Engineering Co., Inc., The, Warren, Ohio.

FURNACES—Rivet Heating, Electric
General Electric Co., Schenectady, N. Y.

FURNACES—Wire, Annealing and Galvanizing
General Electric Co., Schenectady, N. Y.
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GAGE BLOCKS
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GAGES—Dial
Starrett, L. S., Co., Athol, Mass.

GAGES—Electric
Sheffield Gage Corp., Dayton, Ohio.

GAGES—Plug and Snap
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Sheffield Gage Corp., Dayton, Ohio.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

GAGES—Pressure & Vacuum Recording
Brown Instrument Co., The, Philadelphia, Pa.

GAGES—Thickness, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

GAGES—Thread Lead
Jones & Lamson Mch. Co., Springfield, Vt.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Sheffield Gage Corp., Dayton, Ohio.

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Castle, Joseph P., & Bros., Phila.

GALVANIZING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

GALVANIZING PLANTS—For Sheets
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Erie (Pa.) Foundry Co.

GAS ANALYSIS RECORDERS
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

GAS FOR INDUSTRIAL USES
American Gas Association, 420 Lexington Ave., N. Y. C.

GAS PRODUCERS
Flinn & Dreffein Co., Chicago.
Koppers Co., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Wood, R. D., & Co., Philadelphia.

GAS RECOVERY COKE OVENS
Koppers Co., Pittsburgh.

GASKETS—Asbestos, Metal or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

GASKETS—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

GEAR CHECKING EQUIPMENT
Michigan Tool Co., Detroit.

GEAR CUTTING
Earle Gear & Machine Co., Phila.
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

GEAR CUTTING MACHINES
Brown & Sharpe Mfg. Co., Prov., R. I.
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Gleason Works, Rochester, N. Y.

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Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pgh.

GEAR LAPPING MACHINES
Michigan Tool Co., Detroit.

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Allis-Chalmers Mfg. Co., Milwaukee.
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Westinghouse Elec. & Mfg. Co., East Pgh.

GEAR PLANNING MACHINES
Gleason Works, Rochester, N. Y.

GEAR SHAVING MACHINES
Michigan Tool Co., Detroit.

GEARS—Bevel
Boston Gear Wks., Inc., North Quincy, Mass.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Richardson Co., The, Melrose Park, Ill.

GEARS—Heat Treated
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Simonds Mfg. Co., Pittsburgh.

GEARS—Herringbone
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Mesta Mch. Co., Pittsburgh.
Philadelphia (Pa.) Gear Works.

GEARS—Machine Cut
Boston Gear Wks., Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Simonds Mfg. Co., Pittsburgh.

GEARS—Non-Metallic
Boston Gear Wks., Inc., North Quincy, Mass.
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
General Electric Co., Schenectady, N. Y.
James, D. O., Mfg. Co., Chicago.

GEARS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

GEARS—Steel, Silent
Waldron, John, Corp., New Brunswick, N. J.

GEARS—Spur
Boston Gear Wks., Inc., North Quincy, Mass.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.
Simonds Mfg. Co., Pittsburgh.

GEARS—Worm
Boston Gear Wks., Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.

GENERATORS—Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Milburn, Alexander Co., The, Baltimore, Md.

GENERATORS—Electric
Fairbanks, Morse & Co., Chicago.
Lincoln Electric Co., The, Cleveland.
Reliance Electric & Engng. Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Pgh.

GENERATORS—Electric, Second Hand. (See Clearing House Section)

GOGGLES—Safety
American Optical Co., Southbridge, Mass.

GOVERNORS—Air Compressor
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

GRABS—For Sheets and Coils
J-B Engineering Sales Co., 1738 Orange St., New Haven, Conn.

GRATING—Flooring, Sidewalk, etc.—See Flooring—Open Steel

GREASE—Lubricating
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

GRILLES—Metal Cane
Diamond Mfg. Co., Wyoming, Pa.

GRILLES—Perforated Metal
Erdle Perforating Co., Rochester, N. Y.
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GRINDING MACHINES—Chucking
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GRINDING MACHINES—Cylinder
Heald Mch. Co., Worcester, Mass.
Hutto Machine Division, Carborundum Co., Detroit.

GRINDING MACHINES—Cylindrical
Brown & Sharpe Mfg. Co., Providence, R.I.
Cincinnati (Ohio) Grinders Incorporated.
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Gallmeyer & Livingston Co., Grand Rapids, Mich.

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Norton Co., Worcester, Mass.
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GRINDING MACHINES—Swing Frame
Vonnegut Moulder Corp., 1807 Madison Ave., Indianapolis, Ind.

GRINDING MACHINES—Tap
Gallmeyer & Livingston Co., Grand Rapids, Mich.

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Cincinnati (Ohio) Milling Mch. Co., The.
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Cincinnati (Ohio) Grinders Incorporated.
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Bakelite Corp., 247 Park Ave., N. Y. C.
Blanchard Machine Co., The, Cambridge, Mass.
Carborundum Co., The, Niagara Falls, N.Y.
Macklin Co., Jackson, Mich.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Norton Co., Worcester, Mass.

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Blanchard Machine Co., The, Cambridge, Mass.

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HACK SAW MACHINES
Armstrong-Blum Mfg. Co., Chicago.
Peerless Mch. Co., Racine, Wis.

HAMMER BOARDS
Irwin, H. G., Lumber Co., 1129 State St., Erie, Pa.

HAMMERS—Air, Forging
Nazel Engineering & Machine Works, Philadelphia.

HAMMERS—Chipping & Riveting—Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Ingersoll-Rand Co., 11 Broadway, New York City.

HAMMERS—Drop
Bliss, E. W., Co., Toledo, Ohio.
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.
Standard Machinery Co., Providence, R. I.

HAMMERS—Helve
Bradley, C. C., & Son, Inc., Syracuse, N. Y.

HAMMERS—Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Ingersoll-Rrand Co., 11 Broadway, New York City.

HAMMERS—Portable Electric
Wodack Electric Tool Corp., Chicago.

HAMMERS—Power
Bradley, C. C., & Son, Inc., Syracuse, N. Y.

HAMMERS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., 1306 Elson Ave.

HAMMERS—Steam
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.

HANGERS—Ball Bearing
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.

HANGERS—Roller Bearing
Hyatt Bearings Div., General Motors Corp., Newark, N. J.

HARDNESS TESTING MACHINES
Shore Instrument & Mfg. Co., The, Jamaica, L. I., N. Y.

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Ajax Mfg. Co., The, Euclid, Ohio.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

HEADS—Spun and Pressed
Central Iron & Steel Co., Harrisburg, Pa.
Worth Steel Co., Claymont, Del.

HEADS—Steel—Flanged & Dished
Central Iron & Steel Co., Harrisburg, Pa.

HEAT RESISTING PRODUCTS—Electric
Globar Div., The Carborundum Co., Niagara Falls, N. Y.
Holden, A. F., Co., New Haven, Conn.

HEAT TREATING
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
General Machine Wks., York, Pa.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Holden, A. F., Co., New Haven, Conn.
Parish Pressed Steel Co., Reading, Pa.

HEAT TREATING COMPOUNDS
Holden, A. F., Co., New Haven, Conn.

HEAT TREATING EQUIPMENT — Air Draw
Holden, A. F., Co., New Haven, Conn.
Maehler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

HEATING RESISTANCE — Non-Metallic
Globar Div., The Carborundum Co., Niagara Falls, N. Y.
Holden, A. F., Co., New Haven, Conn.

HOISTS—Air
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Detroit (Mich.) Hoist & Mach. Co.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Northern Engineering Works, Detroit.
Ridgway, Craig & Son Co., Coatesville, Pa.

HOISTS—Chain
Wright Mfg. Div., American Chain & Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

HOISTS—Electric
American Engineering Co., Philadelphia.
Detroit (Mich.) Hoist & Mach. Co.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Northern Engineering Works, Detroit, Mich.
Philadelphia (Pa.) Gear Works.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Wright Mfg. Div., American Chain & Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

HOISTS—Electric Traveling
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

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Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

HOISTS—Scraper
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Micromatic Hone Co., Detroit.

HOSE—Flexible Metallic
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HOSE—Rubber
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Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

HYDRANTS—Fire
Wood, R. D., & Co., Philadelphia.

HYDRAULIC MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Elmes, Chas. F., Engng. Wks., Chicago.
Hydraulik Gmbh. Duisburg, Germany.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Morgan Engineering Co., The, Alliance, O.
Wood, R. D., & Co., Philadelphia.

INGOT MOLDS
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.
Valley Mould & Iron Corp., Hubbard, Ohio.

INGOTS—Aluminum
Aluminum Co. of America, Pittsburgh.
Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

INGOTS—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.
Du Pont de Nemours, E. I., & Co., Inc. Grasselli Chemicals Dept., Wilmington, Del.

INSTRUMENTS—Recording
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

INSULATION
Johns-Manville Corp., 22 East 40th St., New York City.

IRON—Genuine Open Hearth Iron
Newport (Ky.) Rolling Mill Co., The.

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Ludlum Steel Co., Watervliet, N. Y.

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KEYS—Riveted
Western Wire Prods. Co., St. Louis, Mo.

KEYSEATING MACHINES
Baker Bros., Inc., Toledo, Ohio.
Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

LACING—Belt, Rawhide or Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LACQUER
Sherwin-Williams Co., Cleveland.

LAGGING—Insulating
Quigley Co., Inc., 56 West 45th St., N. Y. C.

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LAMPS—Mercury Vapor
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LAPPING MACHINES
Cincinnati (Ohio) Grinders Incorporated.

LATHES—Automatic
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Mesta Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pitgh.

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Bardons & Oliver, Cleveland.
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Gisholt Machine Co., Madison, Wis.
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

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Rogers Machine Wks., Alfred, New York.

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Dayton Rogers Mfg. Co., Minneapolis, Minn.

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LEAD LININGS
Dietzel Lead Burning Co., Pittsburgh.

LEATHER—Cup
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LEVELING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Wean Engineering Co., Inc., The, Warren, O.

LINING—Converter
Edge Hill Silica Rock Co., New Brunswick, New Jersey.

LOCK WASHER MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

LOCOMOTIVES—Electric
Atlas Car & Mfg. Co., The, Cleveland.
Davenport (Iowa) Locomotives Works.
General Electric Co., Schenectady, N. Y.

LOCOMOTIVES—Gasoline
Plymouth (Ohio) Locomotive Works.

LOCOMOTIVES—Gas-Electric
Davenport (Iowa) Locomotives Works.

LOCOMOTIVES—Industrial
Davenport (Iowa) Locomotives Works.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Plymouth (Ohio) Locomotive Works.

LOCOMOTIVES—Steam
Iron & Steel Products, Inc., Chicago.

LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., The, Cleveland.

LUBRICANTS—Crusher & Grinding
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Gear
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—High Pressure & Temperature
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mine Cars
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mining Machines
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Railroad
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

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LUBRICANTS—Roll Neck—Anti-Friction & Plain
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Tippie & Cleaning
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco; Shell Bldg., St. Louis, and 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

MACHINE GUARD MATERIALS
Erdle Perforating Co., Rochester, N. Y.

MACHINE WORK
General Machine Works, York, Pa.
Houde Engineering Corp., Buffalo, N. Y.
National Rubber Machinery Co., Clifton Div., Clifton, N. J.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

MACHINERY DEALERS — Second-Hand, (See Clearing House Section)

MACHINISTS' SMALL TOOLS
Starrett, L. S., Co., Athol, Mass.

MAGNESITE—Brick or Dead Burnt
Carborundum Co., The, Perth Amboy, N. J.

MAGNESIUM
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

MAGNETS—Lifting
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleve.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.

MALLETS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

MANDRELS—Expanding
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

MANGANESE METAL AND ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

MANHOLE FITTINGS AND SADDLES
Worth Steel Co., Claymont, Del.

MANIFOLDS—Oxygen & Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

MARKING MACHINES
Noble & Westbrook Mfg. Co., The, East Hartford, Conn.

METAL SPECIALTIES
Crosby Co., The, Buffalo, N. Y.
Toledo (Ohio) Stamping & Mfg. Co.
Torrington (Conn.) Company.
Truscon Steel Co., Pressed Steel Div., Cleveland.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.
Worcester (Mass.) Stamped Metal Co.

METAL—Thermostatic Bimetal
Chace, W. M., Co., 1605 Beard Ave., Detroit.

METERS—Electric Welding
Lincoln Electric Co., The, Cleveland.

METERS—Flow
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

METERS—Water & Oil
Worthington Pump & Machinery Corp., Harrison, N. J.

MICA SCHIST
Edge Hill Silica Rock Co., New Brunswick, New Jersey.

MICROMETERS
Starrett, L. S., Co., Athol, Mass.

MICROMETERS—Automatic, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

MILLING MACHINES—Automatic
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Horizontal
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Planer Type
Cincinnati (Ohio) Planer Co.

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Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MOLDING MACHINES
Tabor Mfg. Co., Phila., Pa.

MOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.

MONEL METAL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

MONORAIL SYSTEMS—Hand & Electric
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

MOTORS—Electric
Allis-Chalmers Mfg. Co., Milwaukee.
Century Electric Co., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., Cleveland.
Reliance Electric & Engineering Co., Cleveland.
Westinghouse Elec. & Mfg. Co., E. Ptgh.

MOTORS—Electric, Second-Hand. (See Clearing House Section)

NAILS—Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Youngstown (Ohio) Sheet & Tube Co., The.

NICKEL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

NICKEL ANODES—Rolled or Cast
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

NICKEL SILVER
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

NITROGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

NOZZLES—Sand Blasting
Norton Co., Worcester, Mass.

NUMBERING MACHINES—For Metal
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

NUT MACHINERY — Automatic Cold Pressed
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

NUTS—Acorn
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Castellated
National Acme Co., The, Cleveland.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Cold Punched
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Hot Pressed
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Lock
Standard Pressed Steel Co., Jenkintown, Pa.

NUTS—Machine Screw
Blake & Johnson Co., The, Waterville, Ct.

NUTS—Semi-Finished
Cleveland (Ohio) Cap Screw Co., The.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Thumb Hailesble
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Wing
Parker-Kalon Corp., 196 Varick St., N. Y. C.

OIL & GREASE SEALS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL—Fuel, Low Sulphur
Bennett Oil Co., Inc., 366 Madison Ave., New York City.

OIL RETAINERS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL STONES
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

OILS—Cutting
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.

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Standard Oil Co. (Indiana), Chicago, Ill.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Fuel
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago, Ill.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Lubricating
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Soluble—See Oils—Cutting

ORES—Iron
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Shenango Furnace Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.

OVENS—Coke and By-Product Recovery
Koppers Co., Pittsburgh.

OVENS—Core and Mold
Herrington & Randall, Inc., Detroit.
Holcroft & Co., Detroit.

OVENS—Cross Regenerative
Koppers Co., Pittsburgh.

OVENS—Enameling and Japanning
Carborundum Co., The, Perth Amboy, N. J.
Herrington & Randall, Inc., Detroit.
Machler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

OXY-ACETYLENE — Shape-Cutting Machines
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

OXYGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

PACKING—Felt
American Felt Co., 315 Fourth Ave., N. Y. C.

PACKING—Hydraulic
Rhoads, J. E. & Sons, Philadelphia.

PACKING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Rhoads, J. E., & Sons, Philadelphia.

PACKING—Metallic
Garlock Packing Co., The, Palmyra, N. Y.

PACKING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

PACKING—Sheet, Asbestos or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

PAINT
Sherwin-Williams Co., Cleveland.

PERFORATED METAL
Chicago Perforating Co., 2440 W 24th Place, Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

PHOSPHOR—Copper
Phosphor Bronze Smelting Co., The, Phila.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.

PICKLING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Mesta Mch. Co., Pittsburgh.

PICKLING TANK LININGS
Cellcote Co., The, Cleveland.

PICKLING TANK STEAM JETS
Dietzel Lead Burning Co., Pittsburgh.
Durion Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PIG IRON
Bethlehem (Pa.) Steel Co.
Brooke, E. & G., Iron Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Republic Steel Corp., Cleveland, Ohio.
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Superior Charcoal Iron Co., Grand Rapids, Mich.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

PIG IRON—Charcoal
Superior Charcoal Iron Co., Grand Rapids, Mich.

PILING—Steel Pipe
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

PILING—Steel Sheet
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.

PINIONS—Rolling Mill
Mesta Mch. Co., Pittsburgh.

PINIONS—Wire and Rod
Rathbone, A. R. & J., Palmer, Mass.

PINS—Cotter
Lamson & Sessions Co., The, Cleveland.

PIPE—Cast Iron, B. & S. and Flanged
Wood, R. D., & Co., Philadelphia.

PIPE—Hammer Welded
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

PIPE—New and Second-Hand
Albert & Davidson Pipe Corp., 2nd Ave., 50-51st St., Bklyn., N. Y.
Albert Pipe Supply Co., Inc., Berry and N. 13th St., Bklyn., N. Y.
Greenpoint Iron & Pipe Co., Inc., Stagg & Bogart Sts., Bklyn., N. Y.

PIPE—Seamless Brass or Copper
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

PIPE—Spiral Welded
American Rolling Mill Co., Middletown, O.
Crane Co., Chicago.

PIPE—Standard, Black and Galvanized
Bethlehem (Pa.) Steel Co.
Jones & Laughlin Steel Corp., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

PIPE—Welded, Electric
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.

PIPE COVERING—Asbestos
Johns-Manville Corp., 22 East 40th St., New York City.

PIPE FITTINGS
Crane Co., Chicago.
Jarecki Mfg. Co., Erie, Pa.

PIPE THREADING & CUTTING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Curtis & Curtis Co., The, Bridgeport, Conn.
Jarecki Mfg. Co., Erie, Pa.
Landis Mach. Co., Inc., Waynesboro, Pa.
Merrell Mfg. Co., Toledo.
Murchey Machine & Tool Co., Detroit.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PLANERS
Cincinnati (Ohio) Planer Co.

PLANING MACHINES — Second Hand. (See Clearing House Section)

PLASTICS—Laminated
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS — Laminated or Molded Phenolic
Richardson Co., The, Melrose Park, Ill.

PLASTICS—Molded
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS—Synthetic
Bakelite Corp., 247 Park Ave., N. Y. C.

PLATER'S CLEANING COMPOUND
American Chemical Paint Co., Ambler, Pa.

PLATES—Floor or Cellar Door
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Phila., Pa.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Inland Steel Co., Chicago.

PLATES—Iron or Steel
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Phila., Pa.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh
Ryerson, Joseph T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.
Youngstown (Ohio) Sheet & Tube Co., The.

PLATES—Rolled Manganese
Manganese Steel Forge Co., Phila., Pa.

PLATFORMS—Skid
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

PLUGS—Core Hole
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

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Medart Co., The, St. Louis, Mo.

POWER UNITS—Rotary
New Departure Div., General Motors Corp., Bristol, Conn.

PRECIPITATORS—Electrostatic Dust
Pangborn Corporation, Hagerstown, Md.

PRESS FEEDS—Automatic
Littell, F. J., Mch. Co., Chicago.

PRESSED METAL PARTS
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Crosby Co., The, Buffalo, N. Y.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Whitehead Stamping Co., 1069 W. Lafayette Blvd., Detroit, Mich.

PRESSED STEEL PARTS
Crosby Co., The, Buffalo, N. Y.
Lansing (Mich.) Stamping Co., So. Penn Ave.
Parish Pressed Steel Co., Reading, Pa.
Toledo (Ohio) Stamping & Mfg. Co.
Truscon Steel Co., Pressed Steel Div., Cleveland.

PRESSES—Automatic
Bliss, E. W., Co., Toledo, Ohio.
Henry & Wright Mfg. Co., The, Hartford, Conn.
Niagara Mch. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.

PRESSES—Baling
Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Baling, Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Galland-Henning Mfg. Co., Milwaukee.

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Ajax Mfg. Co., The, Euclid, Ohio.
Hydraulik Gmbh. Duisburg, Germany.
Mesta Mch. Co., Pittsburgh.
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Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mch. & Tool Wks., Buffalo, N. Y.

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Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Zeh & Hahnemann Co., Newark, N. J.

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Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Elmes, Chas. F., Engng. Wks., Chicago.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hannifin Mfg. Co., Chicago.
Hydraulik Gmbh. Duisburg, Germany.
Lake Erie Engineering Corp., 68 Kenmore Sts., Buffalo, N. Y.
Mesta Mch. Co., Pittsburgh.
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Oilgear Co., The, 1311 W. Bruce, Milwaukee.
Wood, R. D., & Co., Philadelphia.

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Manville, E. J., Mch. Co., Waterbury, Ct.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Machine & Tool Wks., Buffalo, N.Y.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Standard Machinery Co., Providence, R. I.
V & O Press Co., Hudson, N. Y.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.
Zeh & Hahnemann Co., Newark, N. J.

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Erie (Pa.) Foundry Co.
Niagara Mch. & Tool Wks., Buffalo, N. Y.

PULLEYS—Iron, Solid & Split
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

PULLEYS—Magnetic
Cutler-Hammer, Inc., Milwaukee.

PULLEYS—Vacuum Cup
Vacuum Cup Metal Pulley Co., Inc., Detroit, Mich.

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American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Whiting Corp., Harvey, Ill.

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Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PUMPS—Boiler Feed
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Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

PUMPS—Centrifugal
Aldrich Pump Co., The, Allentown, Pa.
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Rumsey Pump Corp., Seneca Falls, N. Y.
Ruthman Machinery Co., Cincinnati.
Tomkins-Johnson Co., The, Jackson, Mich.
Worthington Pump & Machinery Corp., Harrison, N. J.

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Ruthman Machinery Co., Cincinnati.

PUMPS—Electric
Fairbanks, Morse & Co., Chicago.

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American Engineering Co., Philadelphia.
Elmes, Chas. F., Engng. Wks., Chicago.
Fairbanks, Morse & Co., Chicago.
Lake Erie Engineering Corp., 68 Kenmore Sts., Buffalo, N. Y.
Rumsey Pump Corp., Seneca Falls, N. Y.
Worthington Pump & Machinery Corp., Harrison, N. J.

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Fairbanks, Morse & Co., Chicago.
Worthington Pump & Machinery Corp., Harrison, N. J.

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Crane Co., Chicago.

PUMPS—Steam
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Vacuum
Pennsylvania Pump & Compressor Co., Easton, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUNCHES & DIES
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

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Bertsch & Co., Cambridge City, Ind.
Cincinnati (Ohio) Shaper Co., The.
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Thomas Mach. Mfg. Co., Pittsburgh.

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Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia.

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RAILS
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Foster, L. B., Co., Inc., Pittsburgh.
Frank, M. K., 480 Lexington Ave., N. Y. C.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

RAILS—Relaying
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Iron & Steel Products, Inc., Chicago.
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RAILWAY EQUIPMENT & SUPPLIES
Fairbanks, Morse & Co., Chicago.
Iron & Steel Products, Inc., Chicago.

REAMERS
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Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

REAMING MACHINES
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RECORDERS—Furnace Atmosphere
Brown Instrument Co., The, Philadelphia, Pa.

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REFRACTORIES
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Cleveland (Ohio) Quarries Co., The.
Illinois Clay Products Co., Joliet, Ill.

REGULATORS—Compressed Gas
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

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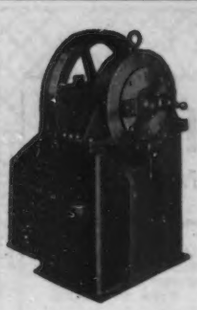

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RUST PROOFING COMPOUNDS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING PROCESS
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SAWS—Friction
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SEPARATORS—Magnetic
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Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

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Heppenstall Co., Pittsburgh.

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Republic Steel Corp., Cleveland, Ohio.
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Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
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Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

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SHEETS—Cold Rolled
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Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
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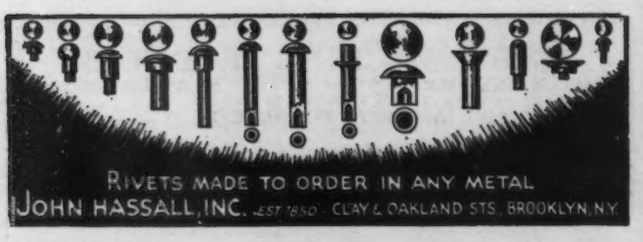

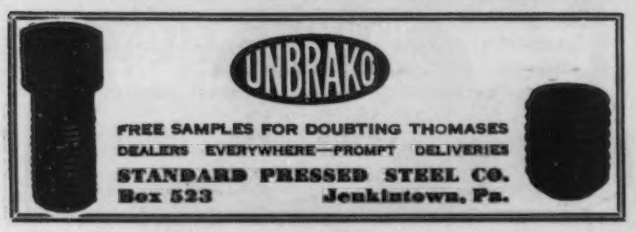

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Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Drill
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Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Electric
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Baker Bros., Inc., Toledo, Ohio.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
National Automatic Tool Co., Richmond, Ind.

TAPS—Collapsing
Landis Mach. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

TAPS AND DIES
Greenfield (Mass.) Tap & Die Corp.
Landis Mch. Co., Inc., Waynesboro, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TEES—See Angles, Beams, Channels and Tees

TELEPHONES—Interior
Screw Machine Products Corp., Prov., R. I.

TERNE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TESTING MACHINES—Materials
Baldwin-Southwark Corp., Southwark Div., Phila.

THERMOMETERS—Recording
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

THERMOSTATIC—Bimetal
Chace, W. M., Co., 1605 Beard Ave., Detroit.

THREAD CUTTING TOOLS—See Die Taps

THREAD ROLLING MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

THREADING MACHINES
Eastern Mcsh. Screw Corp., New Haven, Conn.
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Automatic
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Belt
Murchey Machine & Tool Co., Detroit.

TIE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TIES—BALE
Acme Steel Co., Chicago, Ill.

TIMING INSTRUMENTS
Stillman, M. J., Co., Inc., Chicago.

TIN PLATE
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

TIN PLATE MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

TINNING EQUIPMENT—Sheets
Wean Engineering Co., Inc., The, Warren, Ohio.

TONGS—Automatic
Heppenstall Co., Pittsburgh.

TOOL BITS
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago.
Williams, J. H., & Co., Buffalo, N. Y.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago.
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOLS—Metal Cutting
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Michigan Tool Co., Detroit.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TOOLS—Precision
Starrett, L. S., Co., Athol, Mass.

TOOLS—Safety, Steel Stamp
Cunningham, M. E., Co., Pittsburgh.

Products Index

TOOLS—Tungsten Carbide
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

TORCHES—Brazing, Cutting and Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Milburn, Alexander Co., The, Baltimore, Md.
Weldit Acetylene Co., Detroit.

TORCHES—Gas
Torit Mfg. Co., St. Paul, Minn.

TRACTORS AND TRAILERS—See Trucks, Tractors and Trailers—Industrial

TRAILERS—Industrial—See Trucks, Tractors and Trailers—Industrial

TRAMRAILS—Overhead Systems
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

TRAMWAYS—Wire Rope
Leschen, A., & Sons Rope Co., St. Louis, Mo.

TRANSCRIBING MACHINES
Dictaphone Sales Corp., 420 Lexington Ave., New York City.

TRANSMISSIONS—Hydraulic
American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

TRANSMISSIONS—Variable Speed
Link-Belt Co., Chicago.
Reeves Pulley Co., Columbus, Indiana.

TRAPS—Steam
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

TREADS—Safety
American Pressed Steel Co., Phila., Pa.
Blaw-Knox Co., Pittsburgh.
Central Iron & Steel Co., Harrisburg, Pa.
Hendrick Mfg. Co., Carbondale, Pa.
Norton Co., Worcester, Mass.

TROLLEYS
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.

TRUCKS—Dump (Industrial)
Towmotor, Inc., Cleveland.

TRUCKS—Elevating (Power)
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.
Towmotor, Inc., Cleveland.
Yale & Towne Mfg. Co.; The, Phila. Div., Phila., Pa.

TRUCKS—Factory, Hand
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

TRUCKS—Lift (Hand & Foot)
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Scoop (Industrial)
Towmotor, Inc., Cleveland.

TRUCKS, TRACTORS AND TRAILERS—Industrial
Atlas Car & Mfg. Co., The, Cleveland.
Baker-Raulang Co., The, 2175 W. 25 St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.
Towmotor, Inc., Cleveland.
Yale & Towne Mfg. Co., The, Phila., Div., Phila., Pa.

TUBE MILL MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
United Engineering & Fdry. Co., Pgh.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

TUBES—Boiler
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Steel & Tubes, Inc., Cleveland.

TUBES—Copper Alloy
American Brass Co., The, Waterbury, Conn.

TUBES—High Carbon
Steel & Tubes, Inc., Cleveland.

TUBES—Nickel Silver
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBES—Stainless Steel
Cleveland (Ohio) Tool & Supply Co., The.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ryerson, Jos., T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.

TUBING—Aluminum Seamless
Aluminum Co. of America, Pittsburgh.

TUBING—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

TUBING—Nichrome
Steel & Tubes, Inc., Cleveland..

TUBING—Open Seam
Steel & Tubes, Inc., Cleveland.

TUBING—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

TUBING—Seamless Steel
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Ryerson, Jos. T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBING—Square and Rectangular
Steel & Tubes, Inc., Cleveland.

TUBING—Stainless Steel
Cleveland (Ohio) Tool & Supply Co., The.
Steel & Tubes, Inc., Cleveland.

TUBING—Tinned Brass or Copper
Bundy Tubing Co., Detroit, Mich.

TUBING—Tinned-Steel
Bundy Tubing Co., Detroit, Mich.

TUBING—Tool Steel
Bissett Steel Co., The, Cleveland.

TUBING—Welded Steel
Bundy Tubing Co., Detroit, Mich.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Steel & Tubes, Inc., Cleveland.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBULAR PRODUCTS
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Steel & Tubes, Inc., Cleveland.

TUMBLING BARRELS—See Barrels—Tumbling

TUNGSTEN—Metals & Alloys
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

TUNGSTEN CARBIDE
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TURBINE-GENERATORS—Steam
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

TURBO-COMPRESSORS
Spencer Turbine Co., Hartford, Conn.

TURNTABLES
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

TURNTABLES—Industrial
Canton Fdry. & Mch. Co., Cleveland.

TWIST DRILLS
Cleveland (Ohio) Twist Drill Co., The.
Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

TYPE—Steel
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

UNIONS
Crane Co., Chicago.

UNIT HEATERS—Electric
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.

VALVES—Acid Resisting
Dietzel Lead Burning Co., Pittsburgh
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

VALVES—Air Blast for Presses
Littell, F. J., Mch. Co., Chicago.

VALVES—Air & Hydraulic Control
Brown Instrument Co., The, Philadelphia, Pa.
Galland-Henning Mfg. Co., Milwaukee.
Hannifin Mfg. Co., Chicago.
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

VALVES—Gas, Water and Steam
Brown Instrument Co., The, Philadelphia, Pa.
Crane Co., Chicago.
Jarecki Mfg. Co., Erie, Pa.
North American Mfg. Co., The, Cleveland.
Wood, R. D., & Co., Philadelphia.

VALVES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Crane Co., Chicago.
Galland-Henning Mfg. Co., Milwaukee.
Wood, R. D., & Co., Philadelphia.

VALVES—(Pressure Sealed) Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.

VALVES—Proportioning
Brown Instrument Co., The, Philadelphia, Pa.
North American Mfg. Co., The, Cleveland.

VALVES—Pump, Rubber
Garlock Packing Co., The, Palmyra, N. Y.

VANADIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

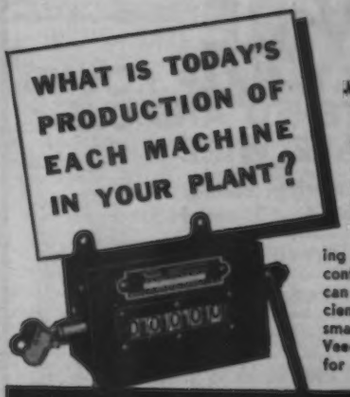
VARNISH—Acid Resisting
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

VISES
Cincinnati (Ohio) Milling Mch. Co., The.
Jarecki Mfg. Co., Erie, Pa.

WASHERS—Iron or Steel
Sessions, J. H., & Son, Bristol, Conn.

WASHERS—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

WASHERS—Lock
American Nut & Bolt Fastener Co., Pittsburgh.
Beall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, Ohio.
Eaton Mfg. Co., Massillon, Ohio.
Heiz & Heiz, Inc., 33—34th St., Brooklyn, N. Y.
Hobbs Mfg. Co., Worcester, Mass.
Houde Engineering Corp., Buffalo, N. Y.
National Lock Washer Co., The, Newark, N. J., and Milwaukee, Wis.
Philadelphia Steel & Wire Corp., Germantown, Philadelphia, Pa.
Positive Lock Washer Co., The, Newark, N. J.



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Washburn Co., The, Worcester, Mass.

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American Nut & Bolt Fastener Co., Pittsburgh.
Beall Tool Co., East Alton, Ill.
Butcher & Hard Mfg. Co., Toledo, Ohio.
Eaton Mfg. Co., Massillon, Ohio.
Hobbs Mfg. Co., Worcester, Mass.
National Lock Washer Co., The, Newark, N. J., and Milwaukee, Wis.
Philadelphia Steel & Wire Corp., Germantown, Philadelphia, Pa.
Positive Lock Washer Co., The, Newark, N. J.
Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.
Washburn Co., The, Worcester, Mass.

WASHING MACHINES—For Metal Parts
Ransohoff, N., Inc., Cincinnati.

WATER SOFTENERS AND PURIFIERS
Scaife, Wm. B., & Sons Co., Ptgh.

WELDING—Copper Hydrogen Electric
Bundy Tubing Co., Detroit, Mich.

WELDING—Electric
Lincoln Electric Co., The, Cleveland.
Una Welding, Inc., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh

WELDING CONTACTORS
Clark Controller Co., The, Cleveland.

WELDING CONTACTS—Resistance
Electroloy Co., Inc., 50 Church St., New York City.

WELDING AND CUTTING MACHINES AND EQUIPMENT—Oxy-Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The., 30 East 42nd St., N. Y. C.
Milburn, Alexander Co., The, Baltimore, Md.
Weldit Acetylene Co., Detroit.

WELDING FIXTURES
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Una Welding, Inc., Cleveland, Ohio.

WELDING MACHINES—Butt
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Electric Arc
Electric Arc Cutting & Welding Co., The, Newark, N. J.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Hobart Bros., Troy, Ohio.
Lincoln Electric Co., The, Cleveland.
Una Welding, Inc., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

WELDING MACHINES—Electric Arc, Second-Hand. (See Clearing House Section)

WELDING MACHINES—Flash
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Press
Swift Electric Welder Co., Detroit.

WELDING MACHINES—Spot
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Universal Spot & Arc
Electric Arc Cutting & Welding Co., The, Newark, N. J.

WHEELS—Rolled Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Standard Steel Wks. Co., Burnham, Pa.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh.

WIRE—Barb
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.

WIRE—Brass, Bronze, Copper, Nickel Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Michigan Wire Cloth Co., 2117 Howard St., Detroit.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

WIRE—Electric Heat Resisting
Globar Div., The Carborundum Co., Niagara Falls, N. Y.

WIRE—Flat, Round Square or Special Shapes
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Insulated
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Roebling's, John A., Sons Co., Trenton, N. J.
Simplex Wire & Cable Co., Cambridge A. Boston, Mass.

WIRE—Mattress
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE—Netting
Ludlow-Saylor Wire Co., St. Louis, Mo.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Brothers, Cortland, N. Y.

WIRE—Piano and Music
Webb Wire Works, New Brunswick, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

WIRE—Special Drawn Shapes
Bathbone, A. B. & J., Palmer, Mass.

WIRE—Spring
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

WIRE—Spring (Music)
Webb Wire Works, New Brunswick, N. J.

WIRE—Stainless Steel
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Webb Wire Works, New Brunswick, N. J.

WIRE—Steel
Bethlehem (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.

WIRE—Water-proof Rubber Insulated
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WIRE—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
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Seneca Wire & Mfg. Co., The, Fostoria, Ohio.
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Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

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Audubon Wire Cloth Corp., Phila., Pa.
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Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE DRAWING MACHINERY—See Wire Mill Mchry. & Equip.

WIRE FORMING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Manville, E. J., Mch. Co., Waterbury, Ct.
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WIRE MILL MACHINERY AND EQUIPMENT
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WIRE PRODUCTS
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Eastern Tool & Mfg. Co., Bloomfield, N. J.
Hindley Mfg. Co., Valley Falls, R. I.
Pittsburgh (Pa.) Steel Co.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Leschen, A., & Sons Rope Co., St. Louis, Mo.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE FITTINGS
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE STRAIGHTENING AND CUTTING MACHINERY—Automatic
Shuster, F. B., Co., The, New Haven, Ct.

WRENCHES
Armstrong Bros. Tool Co., Chicago.
Williams, J. H., & Co., Buffalo, N. Y.

WRENCHES—Pipe
Greenfield (Mass.) Tap & Die Corp.

WRENCHES—Pneumatic
Ingersoll-Rand Co., 11 Broadway, N. Y. C.

ZINC—SLAB (Spelter)
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ZINC—Strip
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12' Plate Bending Roll, Motor Driven. Top Roll 18" dia. Bottom Rolls 14" dia. Capacity 1" Plate
20' Wickes Motor Driven. Top Roll 20" dia. Bottom Rolls 14" dia. Capacity ¾" Plate
25'6" Niles, Arranged for Motor Drive. Top Roll 24¾" dia. Bottom Rolls 18" dia. Capacity 1" Plate
26' Williamette, Motor Driven. Top Roll 28" dia. Bottom Rolls 20" dia. Capacity 1" Plate
30' Southwark Motor Driven. Top Roll 36" dia. Bottom Rolls 23" dia. Capacity 1½" Plate

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54" McKay 17 Roll. Arranged for geared motor drive. Rolls 4 3/16" dia. Capacity No. 16 gauge

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No. 424 Hamilton Straight Side, 9" Stroke. Distance between uprights 42"
800 ton Hamilton Straight Side, 8" Stroke. Distance between uprights 40"
No. 268¼ Toledo Toggle Drawing, Stroke of Blankholder 15½", Stroke of Punch Slide 28"; Bolster Plate 60½"x84"
No. 796¼ Toledo Toggle Drawing, Stroke of Blankholder 21⅜", Stroke of Punch Slide 33"; Bolster Plate 60"x108"

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1200 ton Southwark Four Column, 48"x60" between columns, Slip Ring Motor Drive direct connected to Triplex Hydraulic Pump. Complete with Intensifier, High Pressure Piping and Valves

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Cleveland Style EF, Semi-steel Frame, Motor Driven 48" Throat. Capacity Punch 1¼" thru 1", Shear 1" Plate. Architectural Jaws.

CRANES—A.C. OVERHEAD ELECTRIC TRAVELING

3 ton P. & H.,	29'6"	span, Motors 220/3/60
15 ton Whiting,	45'	span, Motors 220/3/60
10 ton Shaw,	47'4"	span, Motors 220/3/60
50 ton Shaw,	46'8"	span, Motors 440/3/60
7½ ton Bedford,	50'	span, Motors 220/3/60
15 ton Bedford,	50'	span, Motors 220/3/60
20 ton	50'	span, Motors 220/3/60
20 ton P. & H.,	50'	span, Motors 220/3/60
15 ton Champion,	57'	span, Motors 440/3/60

CRANES—D.C.

35 ton Northern,	28'	span. Motors 220 volt	DC
30 ton Niles,	34'8"	span, Motors 220 volt with two hoisting hooks	DC
5 ton P. & H.,	37'9"	span, Motors 220 volt	DC
7½ ton P. & H.,	38'6"	span, Motors 220 volt	DC
5 ton Shaw,	40'	span, Motors110 volt	DC
20 ton Shaw,	53'	span, Motors 110 volt	DC
15 ton Morgan,	60'	span, Motors 220 volt	DC
25 ton Niles,	40'	span, Motors 220 volt	DC
10 ton Morgan,	42'	span, Motors 220 volt	DC
15 ton Whiting,	45'	span, Motors 220 volt	DC
10 ton Morgan,	48'4"	span, Motors 220 volt	
15 ton Shepard,	50'	span, Motors 220 volt	
5 ton Alliance,	50'	span, Motors 220 volt	
15 ton Bedford,	50'	span, Motors 220 volt	DC
25 ton Morgan,	50'	span, Motors 220 volt	DC
10 ton Cleveland,	58'2"	span, Motors 220 volt with two 5 ton Trolleys	DC
25 ton Morgan,	65'	span, Motors 230 volt 500' outdoor runway	DC
25 ton Morgan,	65'	span, Motors 220 volt with smaller auxiliary hoist	DC
25 ton P. & H.,	65'	span, Motors 220 volt with 5 ton auxiliary hoist	DC
20 ton Shaw (2),	66'11"	span, Motors 220 volt with or without runway	DC
40 ton Niles,	71'11"	span, Motors 220 volt with 5 ton auxiliary hoist	DC
5 ton P. & H.,	77'	span, Motors 230 volt	DC
20 ton Alliance,	80'	span, Motors 220 volt mounted on runway 320' long. Has two 10 ton trolleys	DC

CRANE—LADLE

75 ton 55'0" span, Four Girder Ladle Crane with Two Trolleys. 25 ton Auxiliary Hoist, 95% New, Late Type

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2½", 4", 5" Ajax, New Model Machines
2", 3", 5" National, Steel Frame
7" Ajax, Steel Frame

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4"x5" Torrington Single Stand, Two High Cold Rolling Mill, Motor Driven
8¼"x10" Belgian Three Stand, Two High Train Cold Rolling Mill, Arranged for Motor Drive
9"x10" Columbia Two Stand, Two & Three High Rolling Mill, Arranged for Motor Drive
9"x14" Cramp Single Stand, Two High Rolling Mill
9"x14" Columbia Two Stand, Two & Three High Rolling Mill, Arranged for Motor Drive
14"x24" Hill Clutch Co. Two Stand, Two High Cold Strip Mill, Arranged for Motor Drive
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20x36" Two Stand, Two High Strip Mill, Motor Driven

SAW

52" Ryerson High Speed Friction Saw, Hydraulic Feed, Motor Driven. Work Table 24"x36"

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8' 6" Morgan, Motor Driven. Capacity 1¼" Plate

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Garrison Bar Shear. Arranged for Motor Drive. Length of Blade 19 1/16". Capacity 5" Rounds
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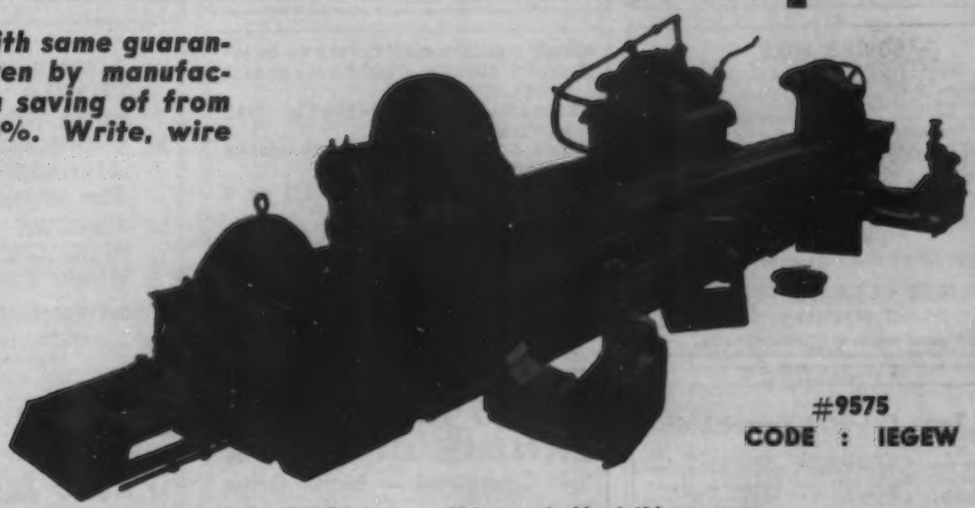

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Arranged for motor drive.
Equipped with suitable motors.

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Maximum swing over ways 45".
Distance between centers 20'.
Wheel capacity 30" diameter.
Motor on headstock 20-horse power.
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Motor on feed mechanism 5-horse power.
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Leveling blocks, assortment of roller rests, pump, piping, tank, all motor equipment, and starters.
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14" Fay Automatics with back angle attachment.

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6"x32"	10"x96"
10"x18"	14"x36"
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14"x 6' American, grd. hd., Taper Attach.
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No. 173-A Consolidated Dble. Crank
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BORING MILLS—Horizontal

CLEVELAND No. 1
GIDDINGS & LEWIS No. 0 3⅛" bar
BEAMAN & SMITH 5" and 6" bar
DETRICK & HARVEY 5" bar

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BULLARD 24"
BAUSH 53"; 2 hds.
KING 60"; 2 swivel heads
NILES BEMENT POND 7-10" Extension
NILES BEMENT POND 42"—44"—51"—53"
POND 90"; 2 hds.

PLANERS

AMERICAN 36"x36"x10'; 3 hds.
CINCINNATI 36"x36"x12'; 2 hds.
NBP 48"x48"x10'; 4 hds.
BETTS 10"x18'; 4 heads

LATHES

PITTSBURGH 36"x28', grd. hd.
PUTNAM 36"x28', 3 step cone, DBG.
PUTNAM 36"x28', Grd. Head—Nearly New
BRIDGEFORD 36"x60' comb. boring and turning
BRIDGEFORD 36"x60', boring
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GREAVES KLUSMAN 16"x10' grd. motor-in-base
McCABE 27-40x10' Double Spindle
LODGE & SHIPLEY 24"x10' cone dr.
GREAVES KLUSMAN 16"x28' motor-in-base
LODGE & SHIPLEY 36"x10' grd. hd.

MILLING MACHINES

ROWBOTTOM 24" Cam Milling Machine
CINCINNATI 24", 48" Automatic
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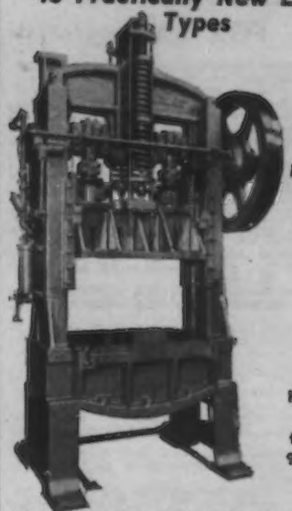

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Care *The Iron Age*, 239 W. 39th St., New York

Procurement Division, Public Buildings Branch, Washington, D. C., July 30, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., Sept. 10, 1937, for construction of the U. S. P. O. at Shelton, Wash- Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch.

Procurement Division, Public Buildings Branch, Washington, D. C., Aug. 3, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P.M., Sept. 7, 1937, for construction of the U.S.P.O. at Short Hills, N. J. Upon application, one set of drawings and specifications will be supplied free to each General Contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer. U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch.

Procurement Division, Public Buildings Branch, Washington, D. C., July 29, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., Aug. 31, 1937, for construction of the U. S. P. O. at Dover-Foxcroft, Maine. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch.

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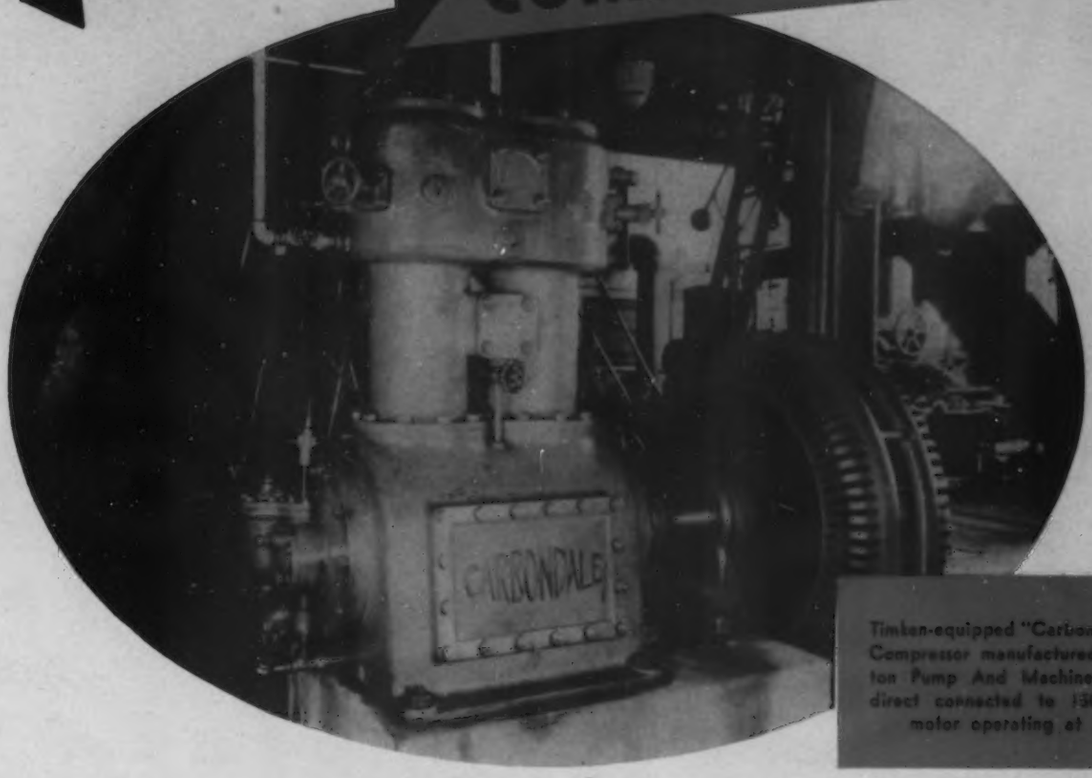
CUTTING COMPRESSOR COSTS



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